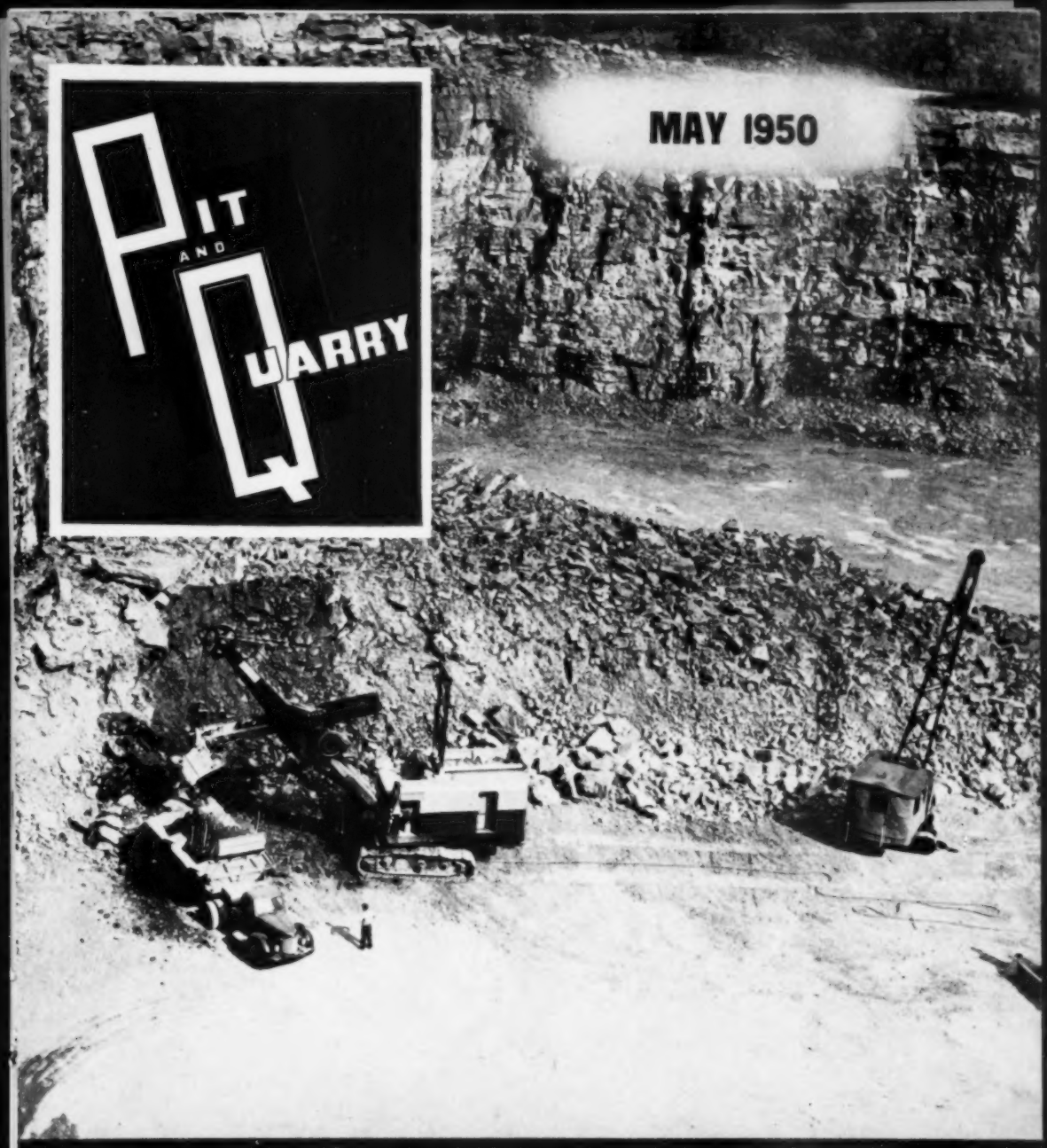

PIT AND QUARRY

MAY 1950

Lime and Agricultural Limestone Number

Expansion Programs at Millard and Boulder Lime Plants • Trace Element Study • Miller, Arizona, and Roseburg Keystone Plants • Rotary Kiln Down Time • Vertical Kiln Draft Control

Table of Contents, Page 9

"built like a Mack Truck"

● The expression "Built Like A Mack Truck" was not coined by us. It worked its way into America's everyday language because for 50 years Mack trucks have been an accepted symbol in the public mind for something extra strong and extra rugged.

To truck users in excavating and quarry work, in pit and strip mining, in oil field hauling — "Built Like A Mack Truck" means even more. It means trucks that are built to build profits . . . designed to give advantages offered by no other make. Powerful Thermodyne and diesel engines! Massive heat-treated frames! Rubber Shock Insulators! Hydraulic Power Steering! Air Assist Clutch! Mack's matchless Balanced Bogie and Power Divider.

All are Mack advantages that assure power and brawn for the heaviest loads . . . easy handling for fast loading and unloading . . . flotation and traction for the most slippery mud or sand.

Find out what "Built Like A Mack Truck" can mean on your particular job — in greater profits through greater output . . . greater economy.

Be Profit-Wise

Modernize with

Mack

. . . outlasts them all!

8018

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

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GOODYEAR INDUSTRIAL RUBBER PRODUCTS
-Specified EMERALD CORD AIR HOSE for
ALL HEAVY-DUTY TYPES OF AIR SERVICE
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Emerald Cord Air Hose is made with one, two or three braids depending on severity of service—is the finest air hose available anywhere.
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A
B
C

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THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

PIT AND QUARRY, May, 1950, Vol. 42, No. 11. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $3 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $2 additional for each year. Single copy 50 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.

Switch
to this new

PLASTIC Reinforced

PRIMACORD

in place of Wire Countered.

Field tested for over a year — where the going is toughest — the new PLASTIC Reinforced Primacord showed itself far superior to Wire Countered Primacord. Yet it costs no more!

Reinforced with rayon yarn, it is stronger and lighter in weight. Finished with a smooth, tough seamless plastic covering, it is waterproof and resistant to acids encountered in mineral ores. It does not become brittle or crack in cold weather, nor is it affected on hot summer days, and it is not a conductor of electricity.

PLASTIC-Reinforced Primacord is your best bet in all deep, wet holes—in preloading, pipe line river crossings, horizontal holes, marine work, coyote tunnels and sleeper shots for seismograph work.

Plastic Reinforced Primacord is recommended for "down" lines where you formerly used Wire Countered Primacord.

1. To make the most effective hookup, use a simple clove hitch in the *ground* line, as shown in these three photographs.

2. The twin loops have been folded over to form a hole.

3. Pass the Plastic Reinforced Primacord through this hole and draw the knot up *tight*.

P-1

THE ENSIGN | BICKFORD COMPANY • SIMSBURY, CONN.

PRIMACORD-BICKFORD DETONATING FUSE • SAFETY FUSE SINCE 1836

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DOORLESS PAN • LIFT DOOR • DROP DOOR

All three types are available in truck bodies and trailers, offering a choice in capacities suitable to meet every requirement in off-highway transportation of earth, rock and ore. EASTON truck bodies and trailers are used in service with all makes of commercial or off-highway trucks or truck tractors.

DOORLESS PAN. The famous EASTON doorless pan trailers and truck bodies are used for efficient, low cost shuttle service between shovel and crusher in quarries throughout the world. Usually dumped by EASTON automatic electric overhead hoist. Hydraulic jacks may be used.

LIFT DOOR. Extra large capacity EASTON lift door trailers and truck bodies are establishing remarkable performance records in mine and quarry service. Dumped by overhead hoist.

EASTON BD-1116H
Side-Dump Truck Body
Automatic Drop Door
Capacity, 16 tons

Every Load Pays Off!

It's another great EASTON truck body. Built to haul more, load faster, dump faster and last longer. Look at these big savings...

extra payload The box-shaped body, especially designed for versatile earth moving service, packs maximum payload into minimum overall dimensions.

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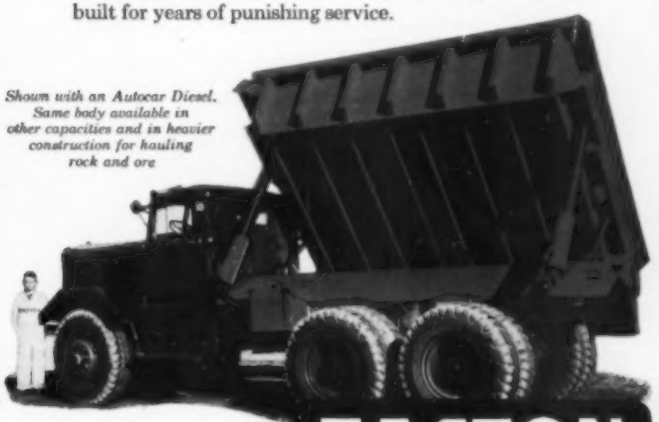
extra strength Dependable EASTON know-how gives these bodies extra long life *without extra weight*. They're built for years of punishing service.



Shown with an Autocar Diesel. Same body available in other capacities and in heavier construction for hauling rock and ore

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TRAILERS • TRUCK BODIES

Investigate, now! For prompt attention please write directly to:

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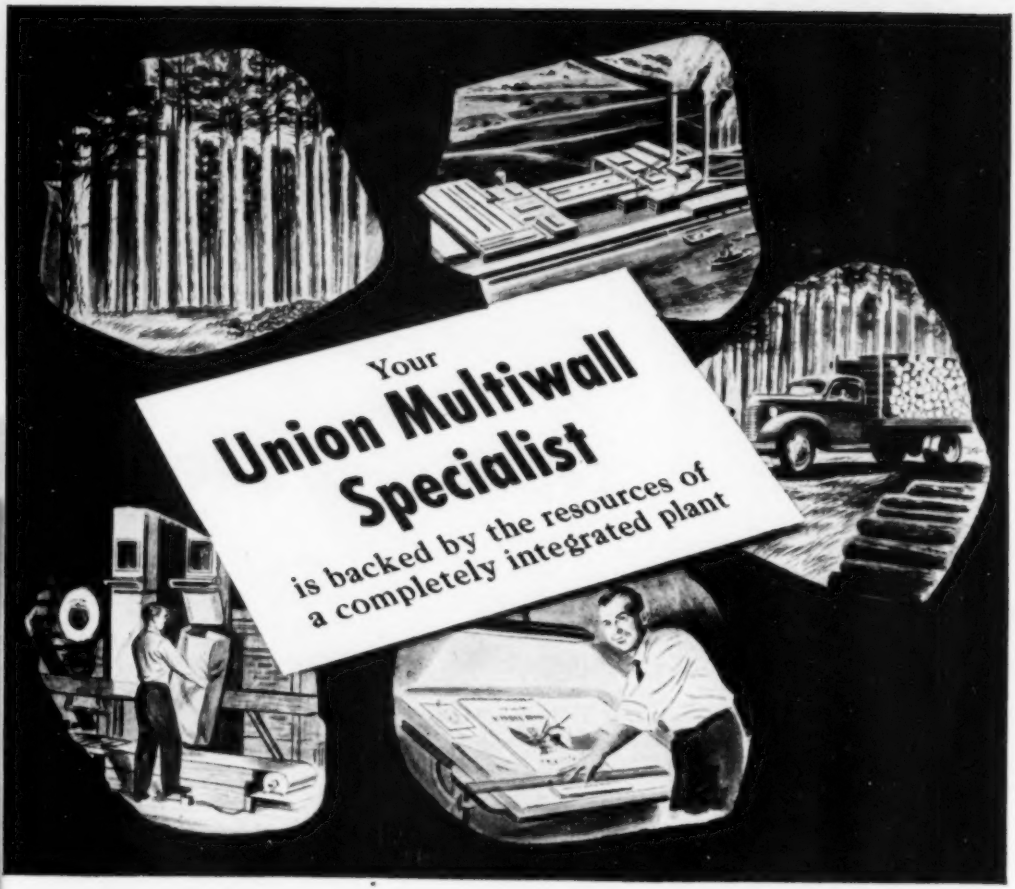

THE extra assurance shippers feel in doing business with the world's largest pulp-to-bag plant is one of the reasons that doors open for the Union Multiwall Specialist.

Union's complete integration, from vast forest resources to finished bag, insures consistent quality, dependable service and fair price.

So when your Union Multiwall Specialist calls, hear his story. Whether you are now packing in multiwall bags or not, he has resources at his command that could be of real value to you.

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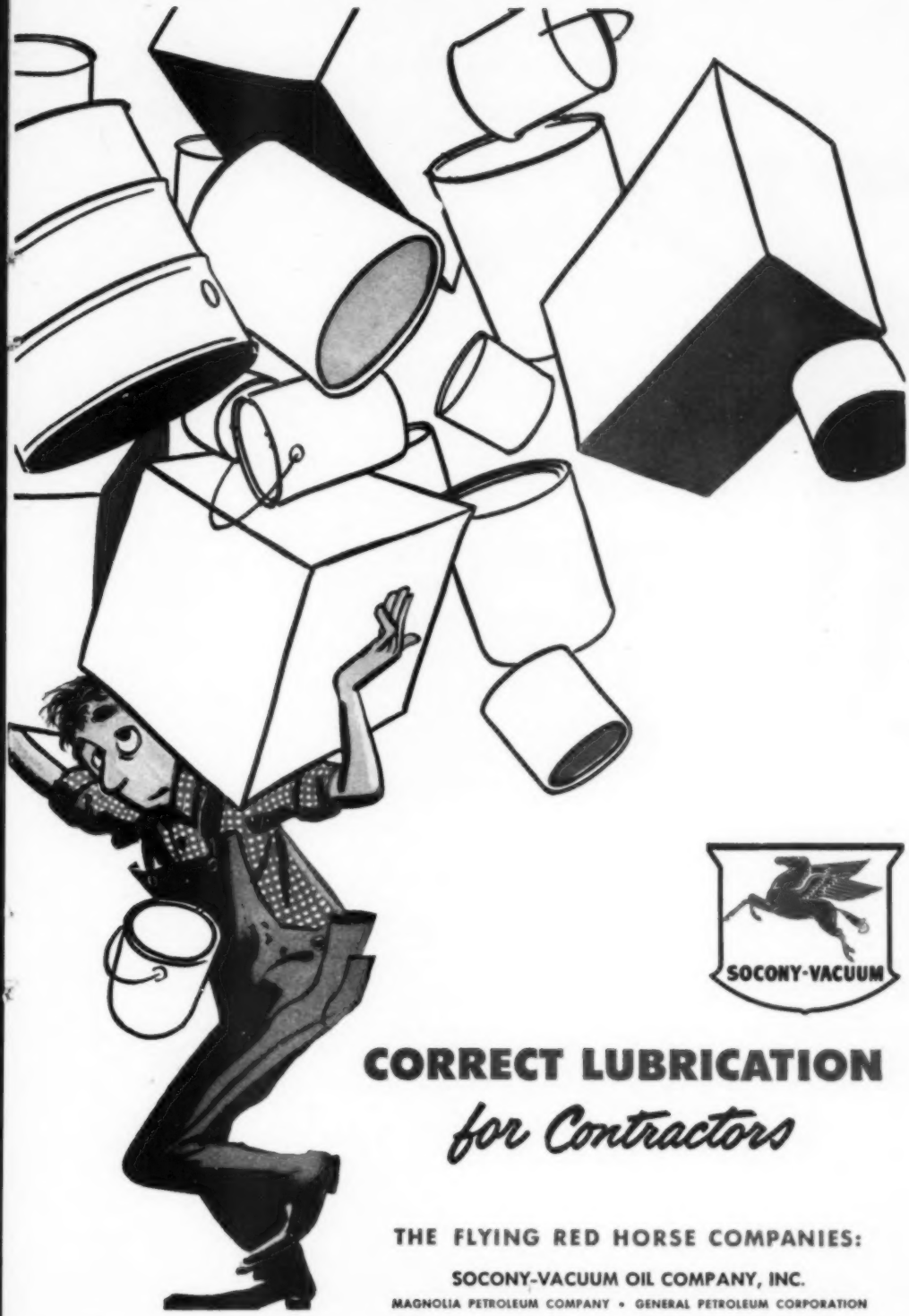

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CO-26

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

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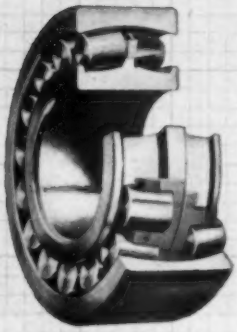
Marion type 43-M excavators swing smoothly into every job

on TORRINGTON SPHERICAL ROLLER BEARINGS



SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
NEEDLE
BALL
NEEDLE ROLLERS

The Marion Type 43-M excavator is designed for all-purpose work—as a one cubic-yard shovel, clamshell, dragline, backhoe, crane or pile driver. It's also designed to swing easily under load, with Torrington Spherical Roller Bearings on the center journal.

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HOW TO Handle a Variety of Jobs on a Single, Lower Investment

—USE THE Allis-Chalmers HD-5G and Tracto-Shovel Interchangeable Attachments*

You can load sand, rock, gravel — materials of all kinds — from pits or stockpiles, build haul roads, handle any excavation, dig and backfill trenches, plow snow or load it, cut costs on dozens of other jobs — all with this standard machine and one or more specially designed attachments. Investigate this all-around, year-around money-saver . . . NOW!

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BIG WORK CAPACITY—This completely new smaller tractor has big tractor design, balance and stamina . . . surprises users everywhere with its performance. As owners say, "You've got to see it to believe it."

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*These 14 Tracto-Shovel Attachments

Can be Interchanged in but a Few Minutes

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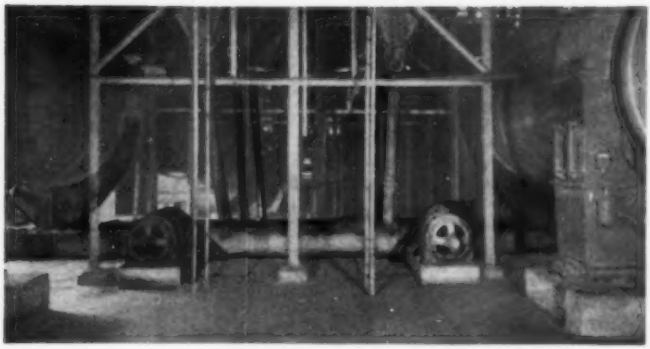
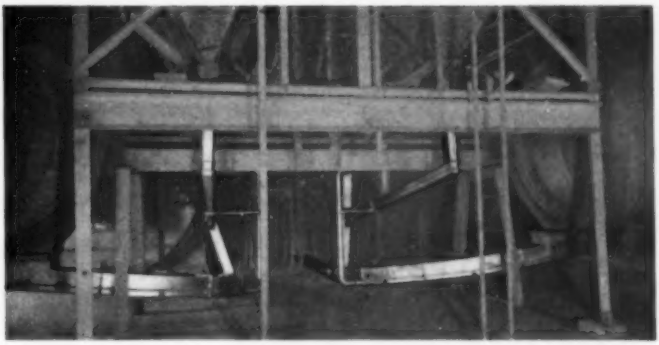


The conventional conveying system above required four motors—two not shown—to drive 2 sets of 2 screw conveyors which carried cement from two finishing mills. Hoppers (both views) discharge precipitated cement dust to the system.

F-H Airslide Conveyors have taken over! Note simplicity of equipment and how much less is required to do the same job!



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COMPRESSORS AND VACUUM PUMPS
FEEDERS, AND ASSOCIATED EQUIPMENT

FH-12

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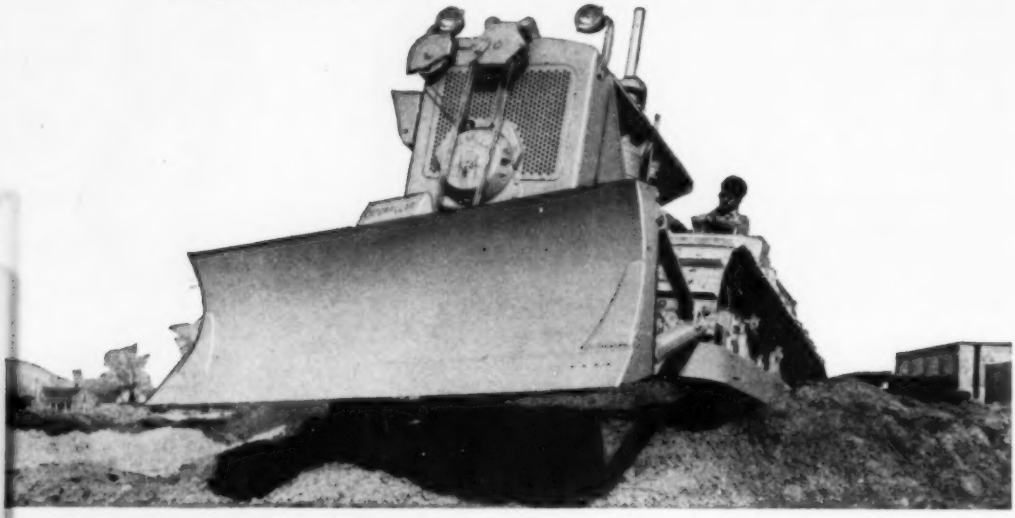

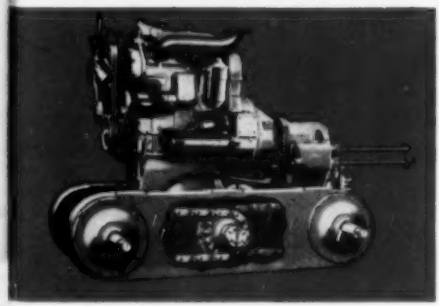

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NAME ANY LUBRICATION PROBLEM you can think of! There's the right grade and type of Cities Service lubricant to do a real job for you. This performance-tested line of quality products will help speed your heavy duty operations, cut maintenance costs, prevent equipment breakdowns. Get in touch with the nearest Cities Service office to learn how these high grade lubricants can help you.

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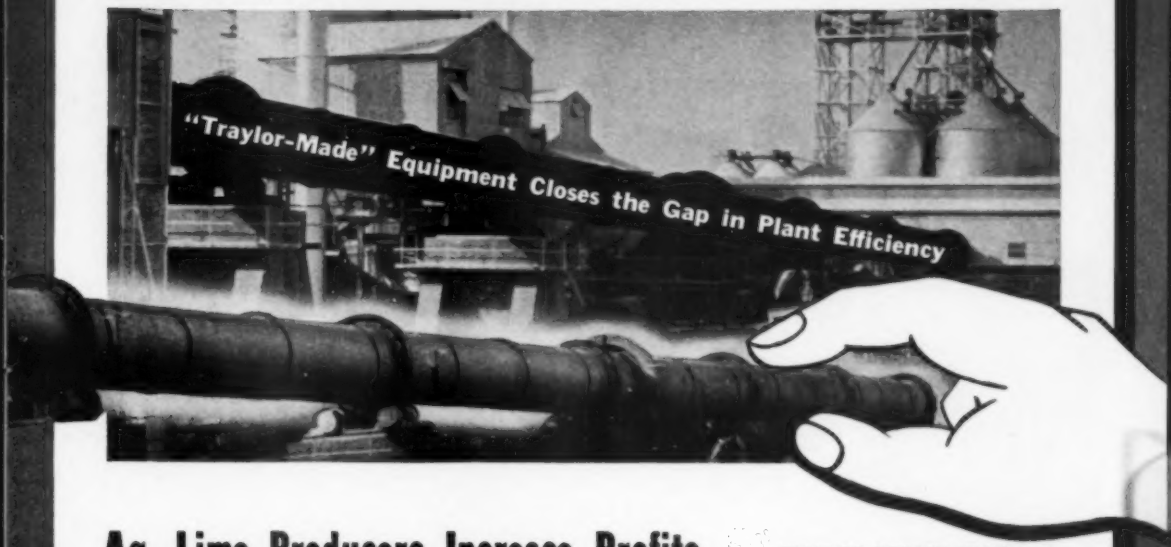

Ag. Lime Producers Increase Profits

with the amazing operating efficiency of

TRAYLOR LIMESTONE MACHINERY

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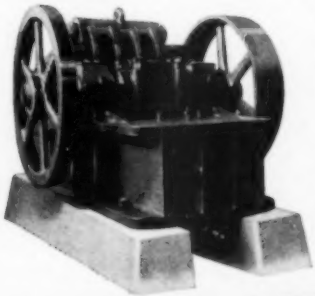

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TRAYLOR JAW CRUSHERS USE curved crushing surfaces to apply power as a direct crushing force. Power usually wasted lifting and churning material is saved.

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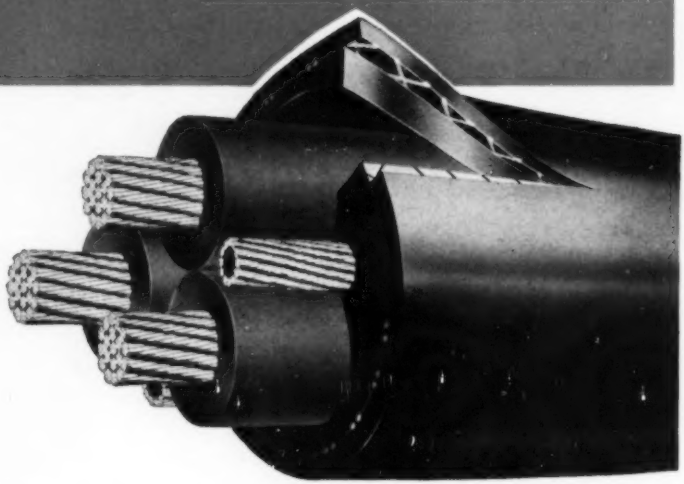
Another big improvement in Securityflex 600-V Mine Cable



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That means longer cable life, fewer power interruptions, less maintenance trouble, *much more value for your money.*

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EIMCO RockerShovel 104

Eimco 104 RockerShovel loading sand and gravel (weight: 125 lbs. per cu. ft.) at the rate of 8 yards per minute.

"A crawler-mounted RockerShovel for rock." This is the cry we've heard from RockerShovel users for many years—and now, after years of field testing, we have the machine our friends have asked for.

The 104 Eimco RockerShovel is the same rugged type of machine that has been the preferred loading equipment underground for many years—the same overhead principle pioneered by Eimco – the same heavy-duty construction throughout.

The Eimco 104 RockerShovel is designed for loading heavy, abrasive rock or sand and gravel using a 1¼ yard bucket for heavy rock, and a 2 yard bucket for sand and gravel. The 104 is available with a 48 H.P. Diesel engine, or 30 H.P. Electric motor.

This machine is ideal for loading, bulldozing, or cleaning in roadwork, quarries, stock piles, and mines. Operators are finding new uses for it every day.

Write for more information.

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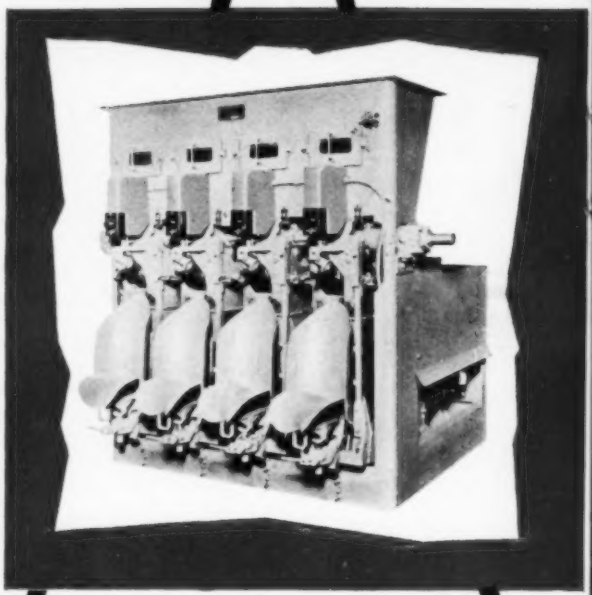
for cement... St. Regis multiwalls and packing machinery!



Cement Mill pack-house crews prefer St. Regis Multiwall Paper Bags because they give more efficient service on the packers—mean fewer delays.

Cement Mill executives prefer St. Regis Multiwalls for their higher, more uniform quality and construction—the dependability of St. Regis deliveries—plus superior engineering and technical services. St. Regis for years has supplied Multiwalls to more of the leading cement mills than any other manufacturer.

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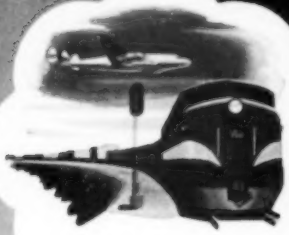
1080—19th Ave., Oakland 6, Cal.

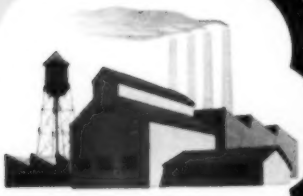
LOGGING



TRANSPORTATION

MINING

PETROLEUM



MANUFACTURING

MARINE

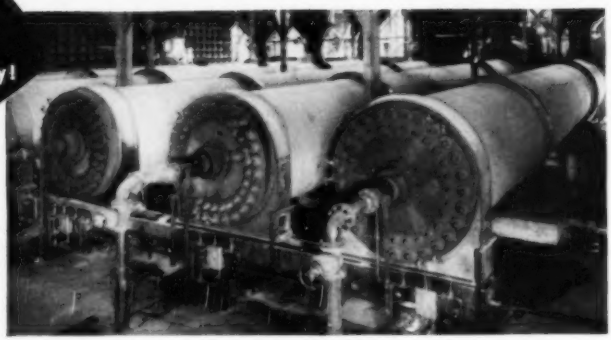
CONSTRUCTION

A. E. Brotman

See Louisville for
CREATIVE DRYING ENGINEERING

LOUISVILLE DRYERS pay their way

KNOW THE RESULTS Before You Buy!



Savings sometimes can't be evaluated in dollars but they are there just the same.

A large company decided to investigate the possible advantages of refining a mined product at its source instead of hundreds of miles away. The purpose was to eliminate considerable freight on water as well as shipping a great quantity of unusable material.

A process was developed which greatly reduced the amount of rejects but it required unusually careful handling in the drying. The problem was presented to a Louisville Drying specialist. The correct answer was found in Louisville's unique research and development laboratory. The full-size installation was designed and installed with confidence of complete success—because it was proven correct in advance in Louisville's pilot plant.

Obsolete methods may be reducing your profits. Ask for a Louisville engineer to survey your drying processes. There's no obligation.

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Kilns, Pressure Vessels

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
GENERAL AMERICAN TRANSPORTATION CORPORATION
Dryer Sales Office: Hoffman Bldg., 139 So. Fourth Street
Louisville 2, Kentucky
General Offices: 135 South La Salle Street, Chicago 90, Illinois
Offices in all principal cities

GENERAL

WORKS FASTER, SAFER, AT LOWER COST

For most work off the road

For most work on the road

GENERAL U. C. M. is specially designed for roughest jobs. Stronger nylon cord body; more natural rubber thicker, tougher tread built extra deep for extra traction, shock absorbing design.

GENERAL H.C.T. has more rubber to resist cuts, bruises, wear, punctures. Deep tread grooves develop more traction, off the road, safe traction on the road.

GENERAL UNDERGROUND MINING TIRE is built with more rubber to give greatest resistance to shoulder snagging, chipping, cutting. Deep, diagonal rubber lugs roll and steer easily; give maximum traction.

THE GENERAL TRUCK TIRE

SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT

1. **STRIPPING OVERBURDEN.** Off to a good start! A sturdy "Caterpillar" Diesel D7 Tractor with "Caterpillar" Cable Controls pulls a "Caterpillar" No. 70 Scraper stripping overburden. This husky Scraper really gets down to earth loading—and its 'dozer-type ejection speeds dumping. The outfit is working on a stripping job near Hillcrest, Alberta, Canada.

2. **BLAST HOLE DRILLING.** No time wasted here! The "Caterpillar" Diesel D13000 Engine powering this Gardner-Denver compressor is plenty rugged. It's got the stamina to stick on tough jobs with a minimum of down time. Here blast holes are drilled 30 feet into limestone rock. This equipment belongs to the Ullin Crushed Stone Co., Ullin, Ill.

"CATERPILLAR" POWER

every step of

From stripping overburden to crushing, you'll find it a money-making move to standardize on "Caterpillar" Diesel power. All the units have proved themselves stand-outs—the rugged, reliable Diesel Engines and Electric Sets and the big yellow earthmovers and haulers, matched for peak performance.

Any way you look at it, standardizing on "Caterpillar" really pays off. Your operators work better because they're handling one familiar make. And you slash maintenance costs and down time to a minimum because all parts and service are available through one manufacturer and one dealer.

Your "Caterpillar" dealer knows his business. He's as close as the phone. Let him show you how you can profit by standardizing on "Caterpillar" power.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS

3. **SHOVEL LOADING.** Steady does it! This model 6 Northwest Shovel is driven by a "Caterpillar" Diesel D13000 Engine. Using a 1½-cu.-yd. bucket for loading blasted limestone from the quarry floor, this unit averages from 160 to 180 tons of rock per hour. Like all "Cat" Diesels, the D13000 is dependable and economical to run. A Ullin Crushed Stone Co. operation.

4. **HAULING TO CRUSHER.** Sprinter with stamina! The 15½ tons of shot rock being loaded into an Athey PD10Q Rock Trailer are easy hauling for this "Caterpillar" Diesel DW10 Tractor. It handles easily, too—and eats up hauls with its 24.5 mph. speed. Quick round trips mean money saved—and the DW10 keeps moving on 60-minute hours. A Princeville Stone Co. job near Princeville, Ill.

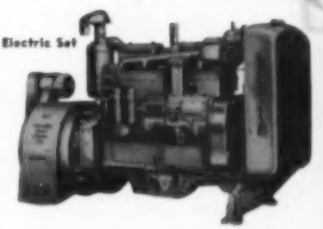
PAYS *the way!*

5. **CRUSHING.** Pay off at the plant! One of three "Caterpillar" Diesel D13000 Engines powering a complete Pioneer Rock Crushing Plant at the Ullin Crushed Stone Co. Production averages over 160 tons of limestone per hour. The D13000s' air cleaners and seals enable them to work in heavy dust clouds with a dependability ordinary engines can't match.

LOOK UNDER THE HIDE

"Caterpillar" pistons are made of highest quality aluminum. Weighing about ⅓ as much as iron, they decrease inertia loading, thus reducing crankshaft and bearing fatigue. Pistons are cooled by an oil spray—prolonging piston life and decreasing lubrication breakdown. Rings are made to high-speed aircraft standards. Each top ring is honed on the sides and lapped on the face—and chrome-plated to offer up to 5 times normal ring and liner life. *Look under the hide for quality and long life—you'll find it in every "Caterpillar" part.*

55-kw. "Caterpillar" Diesel D8800 Electric Set

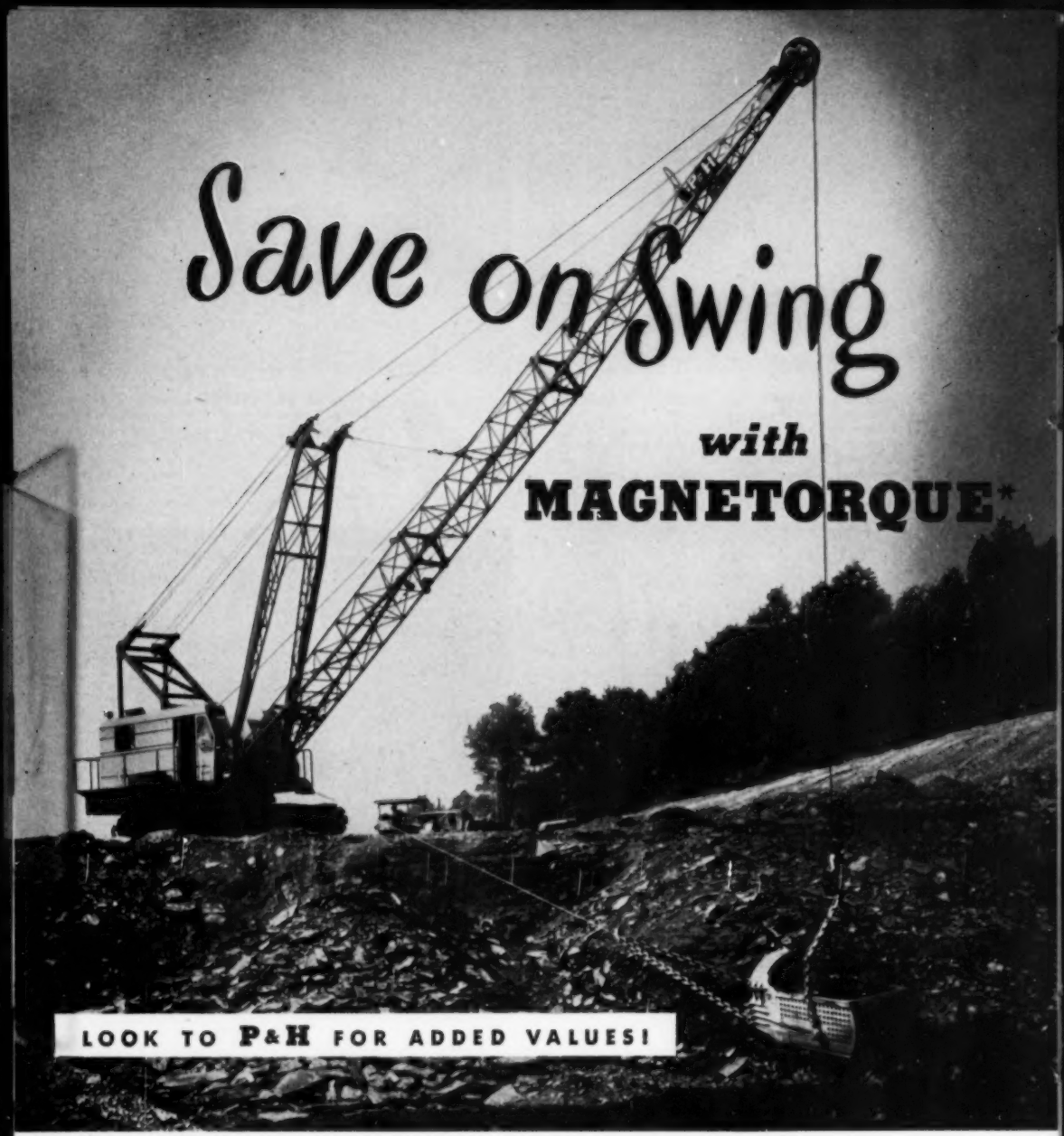


"Caterpillar" offers a complete line of Diesel Engines developing up to 500 hp. and Electric Sets generating from 21 to 314 kw. Leading manufacturers can supply "Caterpillar" Diesel power in the products they build—specify it on your next order!

335-hp. "Caterpillar" Diesel D375 Engine

DIESEL

EARTHMOVING EQUIPMENT



Faster digging cycle . . . up to 20 percent faster . . . is yours with the P&H Magnetorque* electric swing. Only Magnetorque can give you faster, smoother starts and stops that make this possible. It means greater production, lower cost, and more profits. You'll say it's the greatest advancement ever made on large draglines and shovels. You can say good-bye to swing friction troubles . . . once and for all. Power is transmitted electro-magnetically . . . there's no friction . . . there's no wear . . . and far less time-outs to rob production. The smooth operating Magnetorque lasts the life of the machine.

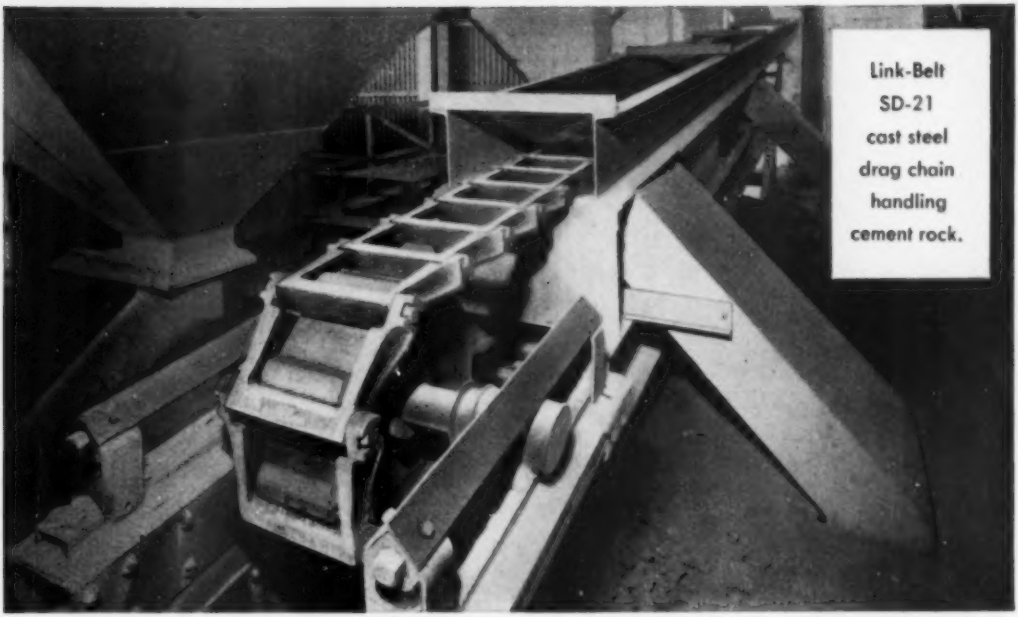
On all kinds of digging the Magnetorque can help you cut yardage costs. Magnetorque electric swing is standard on the P&H 1055 (3½ cu. yds.) and the new 955-A (2½ cu. yds.). Write today, for more information.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

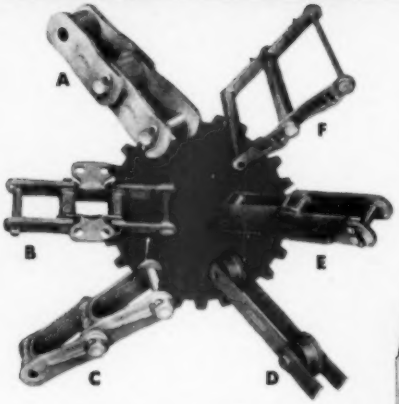
P&H HARNISCHFEGER CORPORATION

EXCAVATORS
4451 West National Ave.
Milwaukee 14, Wis.

EXCAVATORS • OVERHEAD CRANES • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLERS AND TRUCK CRANES



Link-Belt SD-21 cast steel drag chain handling cement rock.



Above: Some of the many standard types . . . A) Class SS bushed roller chain with offset sidebars. B) Class C combination chain. C) Class 800 ley bushed chain. D) Class SS bushed roller chain, long pitch. E) Class SS bushed roller chain with straight sidebars. F) Class H drag chain.

LINK-BELT Cut and Cast-tooth Sprocket Wheels for every chain service. Made in various metals and are available from stock. Section of FLINT-RIM Sprocket, made by special process, shows depth of hard chilled wearing surface for longer service.

Solve your drive, conveyor and elevator problems with LINK-BELT CHAINS

That the service is unusually severe in the sand, gravel, stone and cement industries is another reason for specifying Link-Belt malleable iron, Promal and steel chains and sprocket wheels for original equipment and replacements. They are made in a complete range of standard sizes and types.

Link-Belt designs and builds a complete line of equipment for the handling and preparation of nonmetallic minerals including washers, classifiers, elevators and conveyors, screens, sand separators, enclosed gear drives, bearings and other components. Send for Book No. 2126.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

11,000

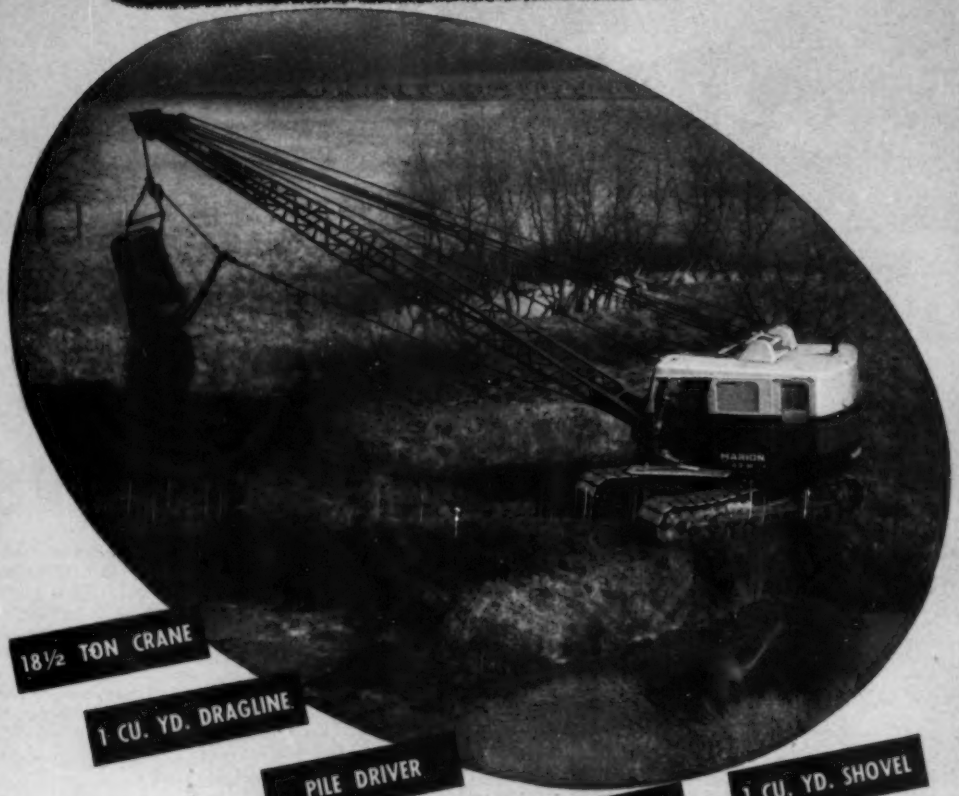
LINK-BELT

Chains and Sprockets

ANNOUNCING THE

MARION 43-M

AN ALL-PURPOSE 1 CU. YD. MACHINE



18½ TON CRANE

1 CU. YD. DRAGLINE

PILE DRIVER

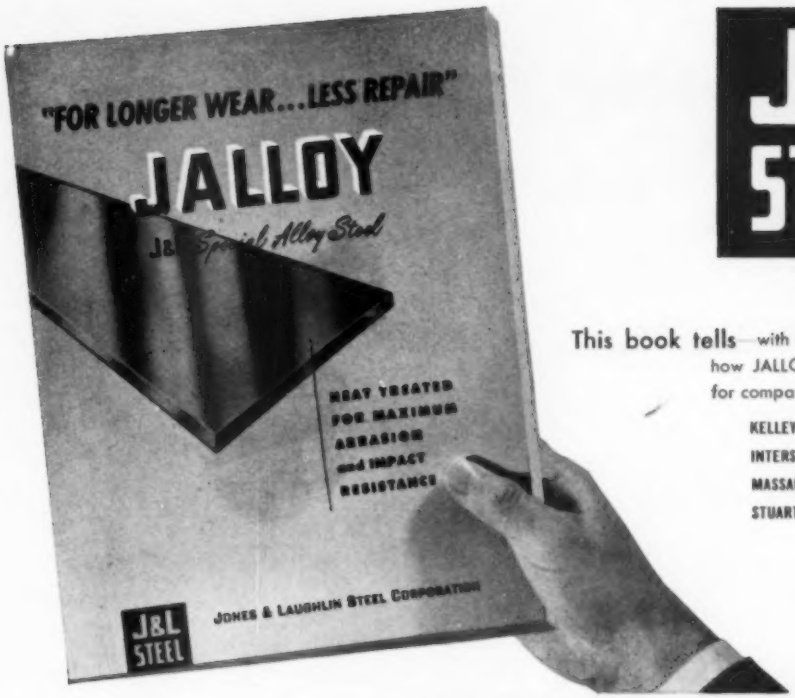
39" BACKHOE

1 CU. YD. SHOVEL

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

from ¾ cu. yd. to 45 cu. yds.


"FOR LONGER WEAR...LESS REPAIR"
JALLOY
J&L Special Alloy Steel
HEAT TREATED FOR MAXIMUM ABRASION and IMPACT RESISTANCE
J&L STEEL
JONES & LAUGHLIN STEEL CORPORATION

J&L STEEL

This book tells—*with facts and figures*—just how JALLOY Steel saves money for companies like these:

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Learn how others SAVE MONEY with J&L JALLOY Steel

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Without obligation, send me a FREE copy of "JALLOY—J&L Special Alloy Steel," the book that tells how I can reduce maintenance cost through *longer wear . . . less repair.*

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

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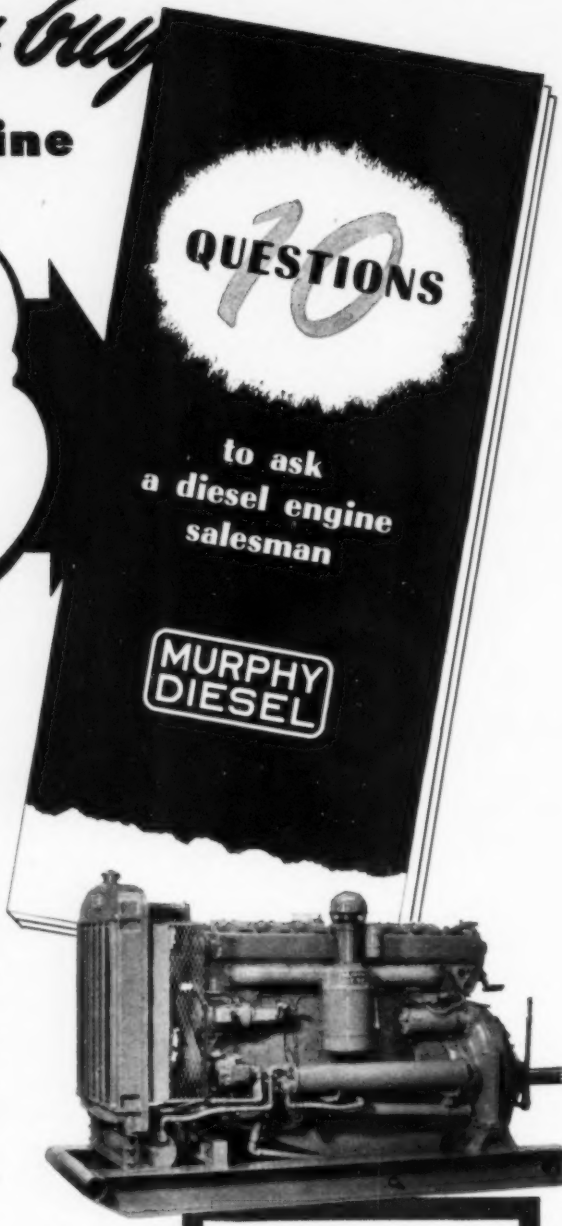
Before you buy

a diesel engine

...be sure and read this booklet!



A sound basis of comparison is essential to the selection of the proper diesel engine to meet your power requirements. And that's just what the booklet *"10 Questions to Ask a Diesel Engine Salesman"* gives you. If you want economy, dependability and long engine life this booklet will show you what to look for in a diesel engine.

In addition, the *"10 Questions"* booklet describes fully the Murphy Diesel line of heavy duty "true" diesel engines, giving design details and basic specifications. No diesel power user or prospective diesel power user should be without this helpful 28-page booklet. Write for your copy, mentioning your company affiliation and position.

MURPHY DIESEL COMPANY
5307 W. Burnham St., Milwaukee 14, Wisconsin

Heavy duty power
for rock crushing
Murphy Diesel Engines and Power Units for portable or stationary crushing plants, 90 to 220 H.P. Generator Sets, 60 to 133 K.W.

EUCLID

STANDARD EQUIPMENT *for* OFF-THE-HIGHWAY HAULING JOBS!

Leading contractors and industrial users of heavy earth moving equipment have standardized on Euclids because they know from experience that "Eucs" increase profits and cut hauling costs. "Euclids sure do the job . . . actually cost less to own than any other hauling equipment," owners say.

Large capacity, dependable performance, and lower operating and maintenance costs have made Euclid the choice for off-the-highway hauling jobs. Designed for a wide range of work, there are models for handling all types of material efficiently . . . earth, coal, ore, rock, and other heavy excavation.

Rear-Dump Euclids range in capacity from 10 to 34 tons and are available with standard or quarry bodies . . . semi-rigid or spring mounted drive axles . . . diesel engines from 125 to 300 h.p. Bottom-Dump models have capacities of 13 to 50 cu. yds., 20 to 40 tons, with diesel engines to 275 h.p.

The parts and service facilities of Euclid's world-wide distributor organization assure prompt, efficient service to all Euclid owners. Write today for complete information on the Euclid line or call your distributor for an estimate on your present or future jobs.

THE EUCLID ROAD MACHINERY CO., CLEVELAND 17, OHIO

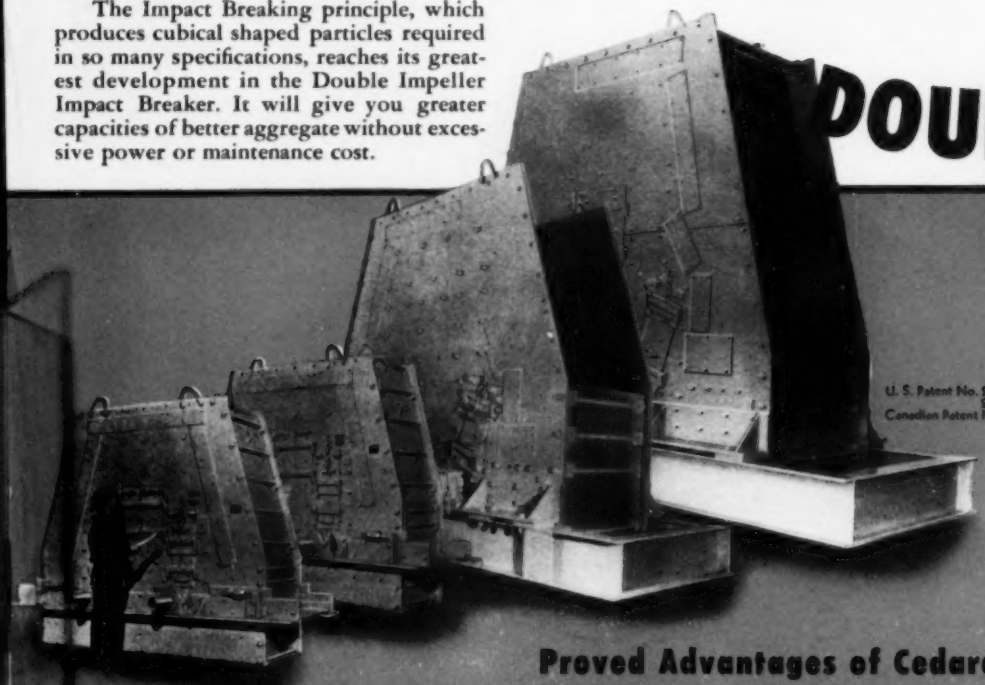
EUCLIDS *Move the Earth*

NOW A

DOUBLE

HERE'S the latest addition to the already broad line of Cedarapids crushers! The Double Impeller Impact Breaker, formerly made by New Holland, makes it possible to handle almost *any* primary or secondary crushing job with Cedarapids equipment.

The Impact Breaking principle, which produces cubical shaped particles required in so many specifications, reaches its greatest development in the Double Impeller Impact Breaker. It will give you greater capacities of better aggregate without excessive power or maintenance cost.



U. S. Patent No. 2173691
2486491
Canadian Patent No. 439371

Proved Advantages of Cedarapids Double Impeller Impact Breaker

EXTREMELY high ratio of reduction means less accessory equipment such as conveyors, hoppers, screens, elevators and secondary crushers.

PRODUCES ideal cubical product even in slabby material. In eastern quarries where conventional types of crushers broke the stone up into high percentages of flats and elongated particles the Impact Breaker reduced the percentage from 24% to 6%.

ELIMINATES most soft stone from the finished product.

Can be operated in contaminated material where most other types of equipment would clog, because a greater number of large pieces of stone or gravel bombarding the cage bars help to keep the breaker clean.

LESS horsepower required per ton of material in most all cases because the massive impellers statically balanced, have a flywheel effect and a great percentage of stone is broken in mid-air by stone hitting stone resulting in a greater reduction in milling and crushing action.

BIG volume production. In a dolomite installation in Ohio the operator claimed 720 tons per hour using two 150 h. p. motors.

APPROXIMATELY 50% less contact of stone on metal because a high percentage of the material is broken by impact against other material rather than against the breaker bars. Also attrition minimized as entire discharge opening is free of grates, etc.

BIG production and high reduction ratio mean lower plant investment.

CHOICE of four sizes from Model 5050, which will take 50" rock up to 400 tons per hour and reduce it to 4" minus in one operation, down to the Model 2020 with its 20" square feed opening.

Cedarapids
Built by IOWA

THE IOWA LINE *of Material Handling Equipment Includes:*

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS
TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE AND GRAVEL PLANTS
REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS
HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • SOIL COMPACTION UNITS
STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

Cedarapids

Built by IOWA

PRODUCT!

IMPELLER IMPACT BREAKER

(formerly New Holland)

DOUBLE IMPACT ACTION GIVES YOU ALL THESE ADVANTAGES

MATERIAL entering the breaking chamber falls directly onto the rotating impellers. Rotating upward and outward at speeds up to 1000 rpm., these Double Impellers smash the material in mid-air. Up to 6000 smashing blows a minute crash against the material in the breaking chamber.

High percentage of fines can be obtained by operating the impellers up to 1000 rpm. with close bar settings, thereby eliminating need for secondary reduction equipment in many instances.

These breakers can be used for primary and secondary reduction depending upon the application and the model used.

Only two moving parts—the impellers—both easily accessible. Minimum down time for repairs or replacements because of simplicity of design.

Sectional view of Cedarapids Double Impeller Impact Breaker showing simplicity of construction and operation. Material falls directly onto impellers and is hurled against the breaker bars and other material in the breaking chamber.

The product size is controlled by the speed of the impellers and the adjustment of the breaker bars. No mechanical change is necessary to change the size of product but simply increase or decrease the rpm.

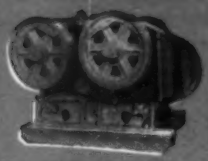
Only Cedarapids Double Impeller Impact Breakers give you all these features. No imitation can equal their performance. Protected fully by patents. Beware of imitations.

To Present Owners of New Holland Double Impeller Impact Breakers

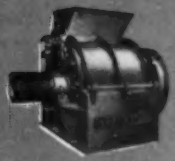
When you need new equipment or replacement parts on your present machine address your inquiries to Cedar Rapids or call your nearest Cedarapids distributor.

OTHER CEDARAPIDS CRUSHERS

JAW CRUSHERS
in sizes from
33" x 40" to 6" x 12"



TWIN JAW CRUSHERS
in four sizes from
1836 to 1316



HAMMER MILLS
in three sizes from
4033 to 2033

ROLL CRUSHERS
in six sizes from
4024 to 1616

KUBIT IMPACT BREAKERS
in four sizes
Nos. 0, 1, 2, 3, 4

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

Green stuff

It's a long way to the National Open, sonny, but you can make it! It takes lots of skill and experience to make a good golfer, to make a good product, and to sell a good product. Chase salesmen have expert knowledge in the bag business—as it applies to your business. Why not call one in today? He'll be eager to analyze your needs, and recommend a container that protects your product, that advertises your product, that helps increase the sale of your product. There is no obligation, of course.

Bags for all industry and agriculture

- cotton bags of all kinds
- Topmill burlap bags
- paper & Multiwall bags
- Saxolin open mesh bags
- combination bags, liners, and specialties.

SINCE 1847

CHASE BAG CO. GENERAL SALES OFFICES, 309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN. • CROSSETT, ARK. • SAN FRANCISCO

DIRECT-TO-YOU SHIPMENTS OF BRONZE BAR STOCK CUT BEARING COSTS!

Stocks of N-B-M "Tiger" Bronze now located for fast delivery of the bar size you want, when you want it.

National Bearing Division has announced a new direct-shipment policy on "Tiger" Bronze Bar Stock—a policy designed to substantially reduce costs of bearings, *used for plant maintenance or on production lines.*

Stocks have been conveniently "spotted" to assure fast delivery. All popular sizes in 13" lengths are available—as-cast or machined cored and solids, or as-cast hexagons.

Product Designers and Plant Engineers with an eye on bearing costs are urged to get the complete facts.

Inquiries receive prompt attention.

"TIGER" BRONZE . . . the ONE Bronze Alloy with ALL these features for longer bearing service at lower cost . . .

WEAR-RESISTANT—Has correct balance between bronze matrix and lead. *Lasts longer.*

ANTI-FRICTIONAL—Low coefficient of friction helps prevent shaft seizure. *Saves power.*

SHOCK-RESISTANT, EMBEDDABLE—Hard enough to stand up under heavy bearing loads. Soft enough to embed foreign material. *Protects the shaft.*

EASY TO MACHINE—With speeds as high as 3000 F.P.M. *Saves time.*

USE THIS COUPON —*for price quotations by return mail, and new bulletin giving complete FACTS on physical properties, operating characteristics, bar types and sizes.*

Please send me your new Cored and Solid Bar Bulletin and prices on "Tiger" Bronze:

Name ..... Title .....

Company .....

Address .....

City ..... State .....

We use Bronze Stock for .....

Approximate poundage used per month: .....

N·B·M

AMERICAN **Brake Shoe** COMPANY

NATIONAL BEARING DIVISION

4941 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

2 TOURNAROCKERS

On Ontario Highway

move 3,000 yards a day on 2 mile round-trip haul

On a 10-mile relocation of provincial highway 17 between Sudbury and Sault Ste. Marie, Ontario, Muskoka Construction Co., Ltd. have found C Tournarockers their most effective hauling equipment for 125,000 yards of rock and 275,000 yards of mixed earth and sand. They replaced *15* two to four-ton trucks with *2* Tournarockers . . . teamed them with a 1½-yard shovel . . . and got the following results:

Average 3,000 Yards in 20-hour Day

On a one-mile, one-way haul, Muskoka's two high-speed Rockers moved 150 yards of mixed sand and rock an hour . . . 3,000 yards every 20-hour working day. Tournarockers had no trouble maintaining continuous operation over soft sandy haul road. Cycles were fast . . . because rig's big target area (11'2" x 7'10") speeded shovel loading, decreased spillage . . . short 90° turn and positive electric steering by push-button control permitted quick, easy maneuvering . . . powerful brakes with 4108 sq. in. of braking surface allowed high-speed hauling.

Faster, cleaner on dump

Dump, too, was fast . . . simple, electric hoist tilted the streamlined body in a few seconds. "Whatever rock we load into our Rockers unloads easily because of the rig's fine ejecting principle," says Mechanical Superintendent William C. Knight. "Have used our Tournarockers in sticky materials too, and had no trouble dumping the loads."

"Best Haulers a Contractor could buy"

Tournarocker's many advantages for big payloads and fast cycles gave Muskoka Company the lowest-cost answer to their hauling problem. That's why Knight says, "Tournarockers are the best hauling units any contractor could ever purchase."

You, too, can profitably cut haul costs and increase profits with Tournarockers. Get an analysis from your LeTourneau Distributor . . . NOW!

Profit Insurance—Tournarocker body is interchangeable behind Model C primemover with equipment below . . . interchangeability enables you to use your investment dollar the year around.

LETOURNEAU
PEORIA, ILLINOIS

TOURNAROCKERS

TRACTION ADVANTAGES of A CRAWLER PLUS HIGH-SPEED on RUBBER

REPLACE 15 DUMP TRUCKS

On ¼-mile one-way haul, two Tournarockers keep 1½-yard shovel humping.

Big 11'2" x 7'10" top opening, plus low entry from rear, give shovel operator an easy-loading target. These 16-ton LeTourneau rock wagons maneuver in close, haul 150 yards of rock an hour.

Send for complete facts to: **R. G. LeTOURNEAU, INC., Peoria, Illinois**

LET

Please send information on ☐ Tournarockers, or on C Tournapull for work with ☐ Carryall ☐ Tournahopper ☐ Tournahauler ☐ Tournacrane ☐ Tournamixer

NAME..... TITLE.....

COMPANY..... TYPE OF BUSINESS.....

STREET..... CITY, STATE.....

Boosting PLANT Capacity with Gyratory Crushers

TELSMITH

THE PALMER CRUSHING CO., SLINGER, WIS.—a top producer in the Milwaukee area—installed Telsmith gyratory crushers to boost plant capacity. A typical glacial moraine deposit with a high percentage of very hard boulders—their pit runs about 65% gravel and 35% sand. A large percentage has to be crushed. The plant, when first built, used a Telsmith 13-B Gyratory as the primary and a double roll crusher as the secondary. Replacing the roll crusher with a Telsmith 36 Standard Gyrasphere Secondary Crusher *upped capacity* 40 to 50%. Now the plant turns out about 225 tons hourly of aggregate, for concrete or for railroad ballast. Two Telsmiths do all the crushing—turn out well-cubed products—and still have plenty of crushing capacity in reserve. A Telsmith Sand Classifier, with 20" x 15' twin screws, recovers all sand. In this plant it was Telsmith Equipment *again* for Mr. Palmer. The reason—Telsmith big capacity and better performance in his two other plants. Get Bulletin G-15.

G-17

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

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51 East 42nd St. New York 17, N. Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 238 Main Street Cambridge 42, Mass. · Boeheck Eqpt. Co. Milwaukee 3, Wis. · Brandeis Mach. & Supply Co., Inc. Louisville 8, Ky.

Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • General Machinery Co., Spokane 1, Wash. • Interstate Equipment Co., Statesville, N. C. • Rish Equipment Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 19, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

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AXLES pay for Themselves Over and Over

Eaton 2-Speed Axles give your trucks added utility, improved performance, faster operating speed, more pulling power. They effect important savings in operating and maintenance costs. Eaton 2-Speed Axles provide the right gear ratio for road and load conditions. They permit engines to run in the most efficient and economical speed range, reduce stress and wear on vital vehicle parts and actually make trucks last longer. Eaton 2-Speed Truck Axles are available for most trucks of the 1½-ton class and larger. Ask your truck dealer how they will more than pay for themselves in your operation.

Axle Division
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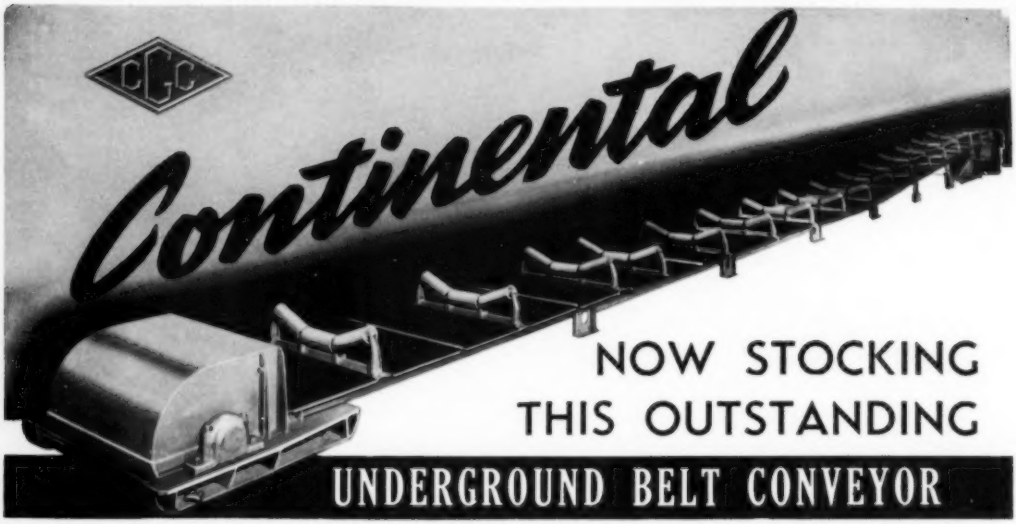
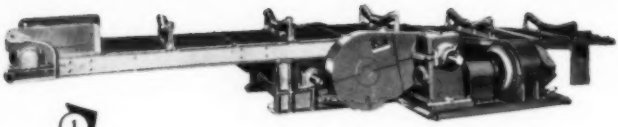


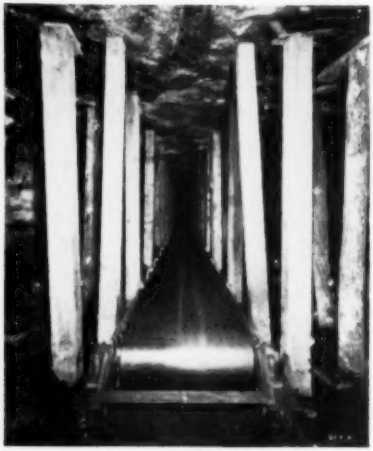
NOW STOCKING
THIS OUTSTANDING

UNDERGROUND BELT CONVEYOR

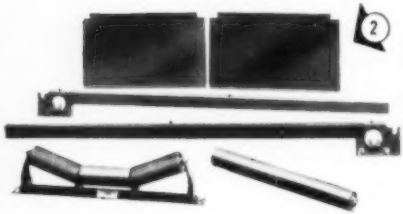
THESE *Superior* DESIGN FEATURES:



① DRIVE SECTION—Designed for easy dismantling. Available for A.C. or D.C. operation up to 75 H.P. Larger drive units upon request.



Typical CONTINENTAL underground Belt Conveyor installation.



② INTERMEDIATE SECTION — Designed for easy erection and dismantling, thus requiring a minimum of personnel during moves or extensions. Available in lengths up to 3000 feet.

③ IDLER ROLL — Four-inch diameter anti-friction idler rolls. Designed for complete lubrication from either side.

CG-4906A

Complete units available in 24", 30", 36" and 42" belt widths.

For other types of Belt Conveyor equipment, see our catalog ID-481

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

"DEPENDABLE... on Burning Sand or Mountain Pass!"

HIS OUTFIT IS JUST FINISHING A DESERT PROJECT WHERE THE TEMPERATURE REACHED 110°. NEXT WEEK HE MOVES TO A ROCKY MOUNTAIN PASS - HIGHEST ELEVATION, 10,057 FEET. THAT'S WHY HE USES **GARDNER-DENVER** PORTABLES. THEY KEEP WORKING ANYWHERE.

Gardner-Denver Portable Compressors are available in sizes from 105 to 500 cu. ft. actual capacity.

Ask the men who go after the big jobs—the tough jobs! They'll tell you that two-stage Gardner-Denver Portable Compressors assure full capacity air at *any* altitude—under *all* weather and temperature conditions. Completely water-jacketed cylinders eliminate cold, unlubricated starts—require no "cooling off" periods even in torrid desert heat. For better compressor performance—all the time—choose Gardner-Denver!

GARDNER-DENVER SINCE 1859

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver (Canada) Ltd., Toronto, Ontario

Automotive Shovel With Hydraulic Crowd and Hoist Speeds Up Excavation Work

Unit Reduces Excavation Costs; Loads Up To One Cubic Yard A Minute

MOVING SHOVEL LOADERS to and from jobs is one of the most expensive unproductive costs in excavation work. Contractors lose hundreds of hours and spend thousands of dollars annually moving this equipment. Developments since the war show that contractors can be relieved greatly of these costs. One of the most successful developments has been the manufacture of the rubber-tired Dempster-Diggster shovel loader that travels at truck speeds.

THE DEMPSTER-DIGGSTER is shown here digging out a 15 foot bank of hard chert. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels.

Digs Through 15 Foot Bank

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowding reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Manufacturer's tests and contractor's reports show that the Diggster will load up to one cubic yard a minute. This speed in excavation is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the Diggster, of course, can move at the fastest possible speed.

ENCLOSED STEEL CAB protects operator against inclement weather.

Not A Fair Weather Machine Only

Under adverse conditions on a state highway near Charleston, W. Va., recently, the Diggster loaded 150 cubic yards of sticky blue clay in only three hours. The work consisted of cleaning up slides on 14 foot embankments on both sides of a concrete road. The weather was not cooperative, inasmuch as considerable rain fell the night before. But the Diggster showed no tendency to slide. The job foreman stated that it loaded more material in two hours than the $\frac{3}{8}$ and $\frac{1}{2}$ cubic yard truck shovels normally did in an entire day. This and many other operations in inclement weather have proved that the Diggster is not a fair weather machine only.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and $1\frac{1}{4}$ cubic yard (heaped) capacities. Materials handling buckets in $1\frac{1}{2}$ and 2 cubic yard (struck) capacities.

Crawler Traction Available

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.

Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc., Knoxville, Tenn.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS

250 N. Knox
Knoxville 17, Tennessee

145-h.p. Series F-8 Big Job, with special tandem rear axle, one of over 175 Ford Economy Truck models, has an allowable G.V.W. rating as a six-wheeler of 35,000 lbs.

"We doubled tonnage...cut rock delivery costs about 33%"—SAYS H. B. GRAHAM, PUEBLO, COLORADO

"WHAT A TERRIFIC JOB our nine Ford F-8 Big Jobs are doing on the Pueblo to Canon City highway," reports H. B. Graham.

"We have doubled tonnage per day over our previous trucks. And you should see our drivers scramble for a Ford when a new one is delivered. They think the new Fords are the greatest things that ever happened in trucking. I share that opinion because we've cut rock delivery costs about 33%."

Ford trucks do more work! They're Bonus Built with big reserves of strength and power to handle big loads. *Ford trucking costs less!* Volume production know-how results in low original price. Truck engineering know-how keeps operating costs low.

See your Ford Dealer today! Choose from over 175 models ranging from 95-h.p. Pickups to 145-h.p. Big Jobs. G.V.W. ratings from 4,700 lbs. to 22,000 lbs. There's a Ford Truck to fit your job and your budget. And, remember, Ford Trucks "do more per dollar!"

SAVE WITH FORD!
AMERICA'S NO.1 TRUCK VALUE!

★ **SAVE GAS** with Ford Loadomatic Ignition and High Turbulence combustion chambers.

★ **SAVE OIL** with Ford Flightlight aluminum alloy pistons. Cam ground for oil-saving fit at operating temperatures.

★ **SAVE WEAR** with pressure lubricated main and crankpin bearings, Double Channel frame, extra heavy duty axles, big brakes (up to 16-in. by 5-in.)

★ **SAVE ON REPAIRS** with demountable brake drums, brake inspection hole, engine-top setting of accessories, plus nationwide service from over 6,400 Ford Dealers.

★ **SAVE TIME** with Ford reliability and performance. The only eight-cylinder engines in trucking. Only Ford gives you a choice of V-8 or Six!

Ford Trucking Costs Less Because—

FORD TRUCKS LAST LONGER

Using latest registration data on 6,392,000 trucks, life insurance experts prove Ford Trucks last longer!

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Send me without charge or obligation, detail specifications on Ford Trucks for 1950.

FULL LINE ☐ **HEAVY DUTY MODELS** ☐
LIGHT MODELS ☐ **EXTRA HEAVY DUTY MODELS** ☐

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Protect your profits with

HAVE you ever noticed how many old-time Koehrings are still operating profitably, day after day in your territory? There's an important "plus" value for you in this long-life characteristic of the Koehring excavator line. You get more than an excavator when you buy a Koehring . . . you get *insurance* that your machine can keep working and earning on heavy, 3-shift schedules during peak periods, war crises, and other emergencies that can occur during the life-time of your excavator.

½ yard 205

Heavy-duty loader in the ½-yard class. Koehring 205 has rugged, dual-purpose boom for both shovel and pull shovel. This saves 20 to 25% over units requiring separate booms. 205 also converts to dragline, clamshell, 7½ to 10-ton crane . . . crawler or rubber tire mount.

1½ yard 605

Koehring 605's fast, smooth swings, cool-running clutches, independent boom hoist, make each shift more productive. Big 37" power clutch requires only 1/10th normal lever pull, rotates "foot". 605 handles all standard excavator attachments . . . including 36-ton life crane.

K905

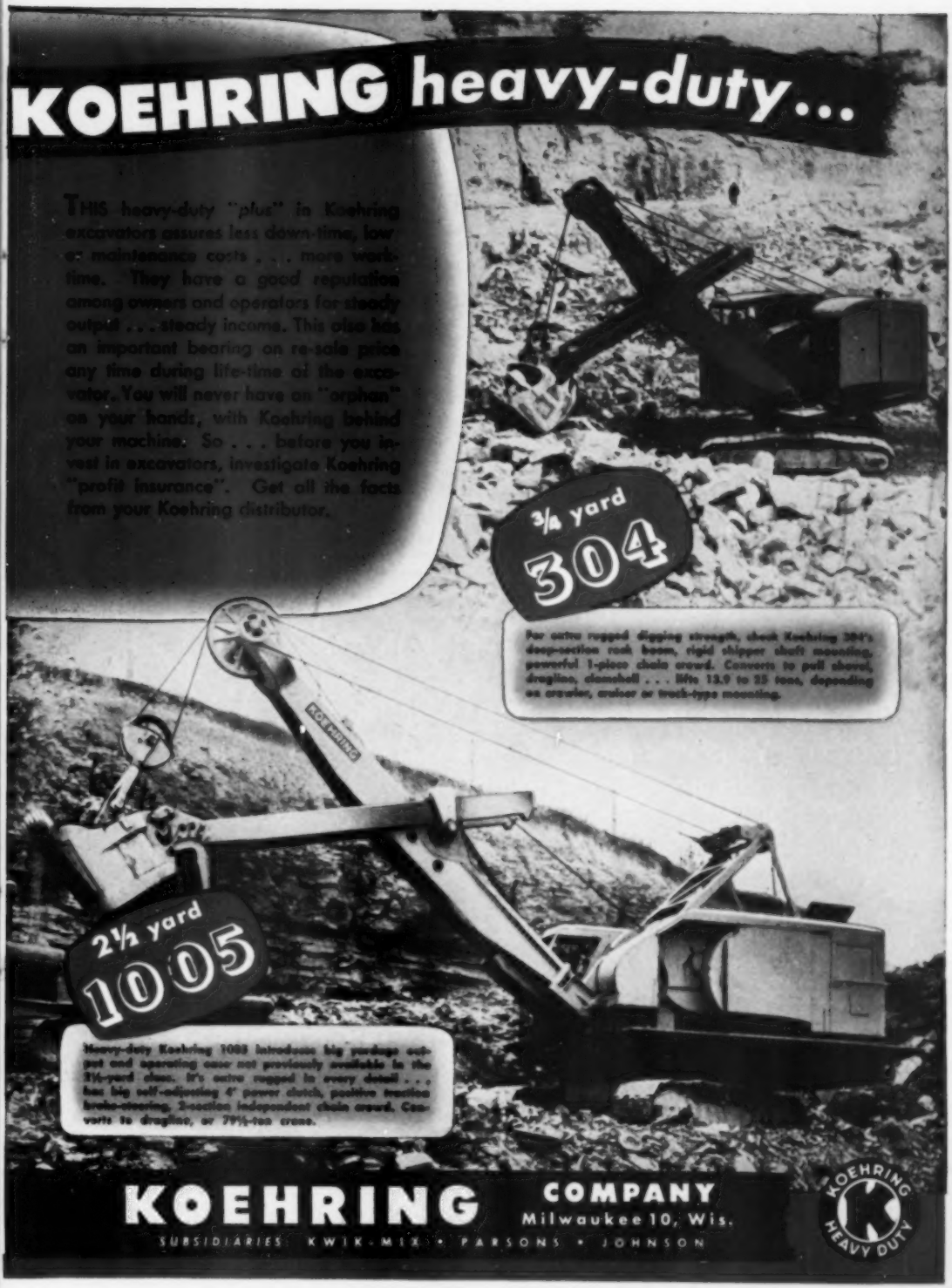
For heavy-duty hauling . . .

Koehring 6-yd. Dumpsters* keep excavator output high . . . hauling costs low. They speed shovel swings . . . maneuver in close . . . provide big 5' x 8' target for loading over end or side. Hy-Torq shuttle haul gets them to dump and back fast! 1-second gravity dump eliminates body-hoist maintenance.

*Trademark Reg. U. S. Pat. Off.

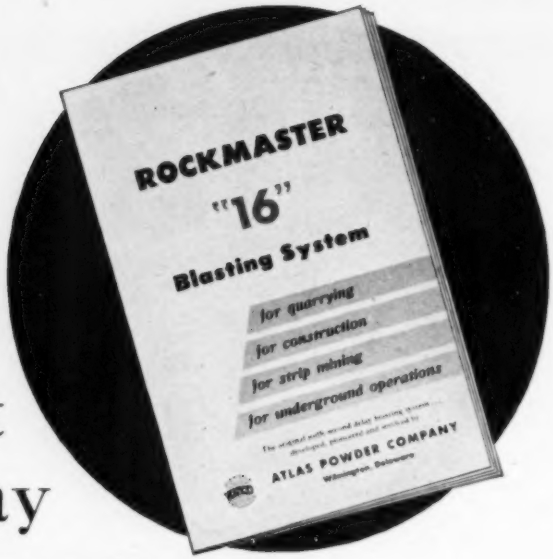
KOEHRING heavy-duty...

THIS heavy-duty "plus" in Koehring excavators assures less down-time, lower maintenance costs . . . more work-time. They have a good reputation among owners and operators for steady output . . . steady income. This also has an important bearing on re-sale price any time during life-time of the excavator. You will never have an "orphan" on your hands, with Koehring behind your machine. So . . . before you invest in excavators, investigate Koehring "profit insurance". Get all the facts from your Koehring distributor.


3/4 yard
304
For extra rugged digging strength, check Koehring 304's deep-section rock boom, rigid shipper shaft mounting, powerful 1-piece chain crowd. Converts to pull shovel, dragline, clamshell . . . lifts 13.9 to 25 tons, depending on crawler, cruiser or truck-type mounting.
2½ yard
1005
Heavy-duty Koehring 1005 introduces big yardage output and operating ease not previously available in the 2½-yard class. It's extra rugged in every detail . . . has big self-adjusting 4" power clutch, positive traction brake-steering, 2-section independent chain crowd. Converts to dragline, or 7½-ton crane.

KOEHRING COMPANY
Milwaukee 10, Wis.
SUBSIDIARIES KWIK-MIX • PARSONS • JOHNSON

KOEHRING HEAVY DUTY



In this booklet you may find the answer to your blasting problems!

WHETHER you blast rock, coal, or ore—on the surface or underground—it will pay you to read the ROCKMASTER "16" booklet.

Read how this blasting system, pioneered by Atlas, controls timing between holes to thousandths of a second, with *sixteen* delay detonators. Read how the proper control of loading, explosives, and timing controls breakage and throw as they never could be controlled before . . . cuts down noise and vibration . . . often means important savings in drilling and dynamite.

This ROCKMASTER "16" booklet includes diagrams of typical loading in quarries, strip pits, mines, and many types of construction. This valuable booklet is free to blasters. Write or phone the nearest Atlas office for your copy *now!*

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† ROCKMASTER: Reg. U. S. Pat. Off.

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"Everything for Blasting"

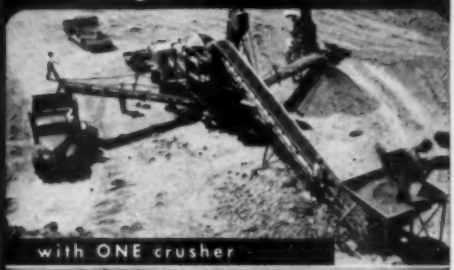
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

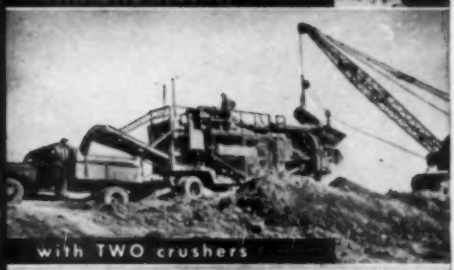
You Name It! We HAVE IT!

Portable (and stationary) rock and gravel crushing, screening and washing plants for every requirement. High speed jaw and roll crushers, with matching conveyors and screens, combined as you want them in a plant that will give you "More Rock for Less Money."

Single-Unit Plants



with ONE crusher



with TWO crushers

with TWO crushers

Multiple-Unit Plants

TWO units . . . TWO crushers

TWO units . . . THREE crushers

THREE units . . . FIVE crushers

Yes, whatever your particular production problem, you will find the answer in an Austin-Western plant. Our engineering department will gladly submit sketches and estimates.

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You can get quick deliveries of AMERICAN explosives and blasting supplies from our well located plants and distributing magazines. The AMERICAN line includes explosives exactly suited to your requirements—produced under intensive research, close chemical control, and unremitting care in manufacture. Always specify AMERICAN.

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EXPLOSIVES DEPARTMENT
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Sales Offices: Pittsburgh, Pa. • Bluefield, W. Va. • Scranton, Pa. • Chicago, Ill. • Pottsville, Pa. • Maynard, Mass.

Now... a 2-Speed Quarry Hoist

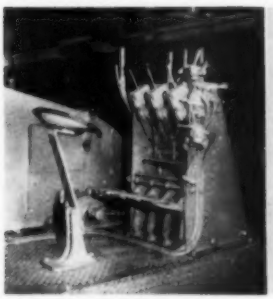
Changes speed with load in motion!

Move your clutch lever one way, and you have the tremendous power of your hoist operating in "low"... power to break loose your heavy loads and hoist them out of the hole. Now—for lighter loads—move the same lever the other way. Instantly, you're in "high"... and you're hoisting rock at speed that means *record production!*

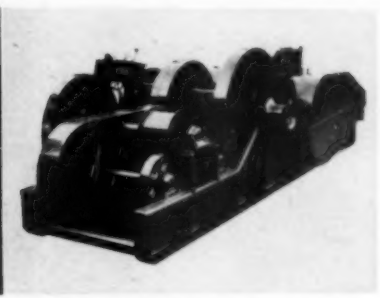
That, in brief, is an operator's view of the remarkable American 2-Speed Quarry Hoist. It's a development that assures more output in quarry work of every kind.

Load capacities on the main hoist drum are 32,000 lbs. in "low" (at 100 feet per minute); 16,000 lbs. in "high" (at 209 feet per minute). Two clutches are synchronized and overlapping... hoist is always in gear... load positively cannot be dropped.

Here is a unit that handles any load, from smallest to largest, at maximum possible speed. For complete details, mail the coupon below.



OPERATOR'S CONTROLS are banked conveniently near the main hoist drum for steady work without fatigue. Braking pedals for lowering the load are designed so operator does not have to "stand" on the brake when he needs maximum braking.



HOIST BED DESIGN is clean and compact. Note the sturdy protection given to vital moving parts. Bed frame is of heavy rolled steel weldment, rigidly cross-braced for maximum strength. Clutches are external contracting band type... safer, smoother, cooler, easier to service. All gears made of high-grade cast steel with machine-cut teeth. Power: electric motor, 100 H.P.

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St. Paul 1, Minnesota

Plant No. 2: SO. KEARNY, N.J.
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● Please send information on the American 2-Speed Quarry Hoist.

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TOUGH MOUNTAIN HAULS
...a daily dish

HAULING 10½ bank yard loads of granite over mountain trails at altitudes up to 8300 feet is a real test of a Diesel engine's brute strength and stamina.

To see how General Motors Diesels take such work in stride, look at the record three LeTourneau Tournarockers, powered with GM Diesels, made for contractors Horner and Switzer on relocation of United States Highway 280 at Granby Dam, Colorado.

Checked on a haul of 1240 feet each way, including a 170-foot stretch of 13% adverse grade, each Tournarocker took only 4¼ minutes to travel, dump and return to shovel. Haul road conditions were poor due to heavy rainfall. Yet haul cycles were so fast that on most distances only two of the Tournarockers were needed to keep the 2½-yard rock shovel busy. Together, these three 16-ton units moved 220,000 yards of granite.

Here is self-evident recommendation of GM Diesel's powerful 2-cycle operation —power at every piston downstroke. It makes them compact, easy to start, quick on the pickup, clean burning and efficient at any altitude.

If you're interested in dependable power with rugged performance and low fuel costs, you'll want all the details about GM Diesels. See your distributor or drop us a line.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . . . Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS . . . Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

• TOP SPEED At ROCK BOTTOM Cost Per Ton

In this rock products plant, a system of S-A designed and installed belt conveyors and vibrating screens handle and process aggregate fast and at lowest cost per ton. Conveyors move aggregate from receiving dump hopper through initial screening and crushing operations to final recrushing, screening, washing and grading. Various sizes and grades of rock products are then conveyed to storage for final shipment. At a centrally located elevated pushbutton control panel one operator observes and controls all operations.

"Speed up operations" . . . "Increase output" . . . "Keep handling costs at a minimum". Such were the specifications S-A engineers faced when they went to work on design of this southwestern rock products plant. The result was a conveying system engineered for fast, continuous handling that permits the plant to operate at peak capacity at moderate cost per ton.

Engineering bulk materials handling systems to reduce costs has been the work of S-A engineers for half a century. Special conditions have been met with special equipment so often that the best ideas were continuously absorbed into the Stephens-Adamson line. Today it is probably the most complete available, in types and range of equipment, and S-A engineers have adapted it in case after case with marked success to exacting specifications.

Let S-A engineers give you their recommendations for improving your bulk materials handling system. There's no obligation . . . no cost to you for this service. Write today.

STEPHENS-ADAMSON MFG. CO.

20 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. · Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Now . . . buell SF ELECTRIC PRECIPITATOR

This announcement of the availability of a made-in-America "SF" Precipitator is NEWS of broad significance. With a Precipitator, also, Buell is in a position to provide any efficiency desired in the collection and recovery of fine and ultra-fine dusts.

The Buell "SF" Electric Precipitator is made under license from Svenska Flaktfabriken, subsidiary of ASEA (Swedish General Electric Company). Through 18 years of engineering experience and more than 150 installations in 11 countries, the broadest range of operating conditions have been met. The "SF" Precipitator now takes up equivalent first line service in the Americas:

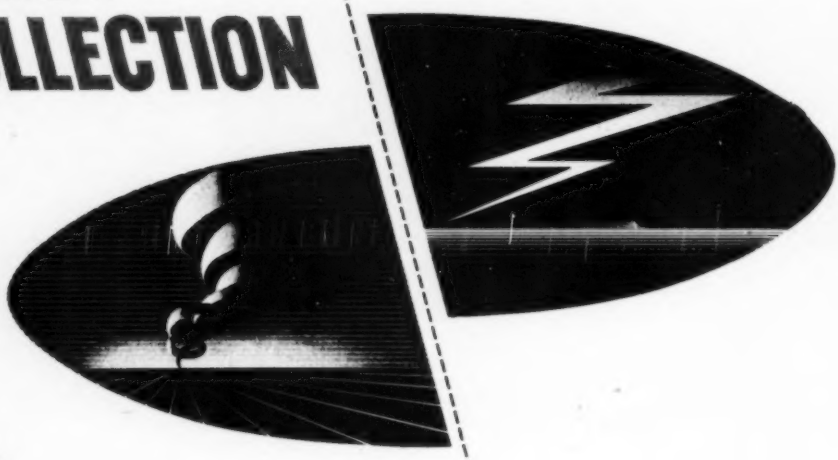
- in separating and collecting dusts of value suspended in process air or gases.
- in fly ash and nuisance dusts collection for general air pollution abatement.

Sizes and types of equipment are standardized to meet all needs.

The Buell Sales Engineering Staff invites opportunity to discuss specific problems. Write, wire or telephone.

World experience in both techniques of

DUST COLLECTION



buell van Tongeren CYCLONE

Scientific dust collection and the doing away with air pollution was just coming into its own in 1935, when Buell introduced to America the high-efficiency van Tongeren designs of AERODYNE.

The Buell van Tongeren Cyclone pioneered in lifting centrifugal dust separation onto a new high plane. How solidly its patented van Tongeren Shave-off contributed to reaching otherwise unobtainable efficiencies is evidenced in the multi-industry use of this Buell System — and 15 year records of multiple re-orders.

For many, many conditions the Buell van Tongeren Cyclone is bound to be first preference, with fractional efficiencies, costs, operating simplicity and long-term reliability all taken into account. Catalog on request.

buell ENGINEERING COMPANY

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What do you get when you buy a ¾ yard shovel?

to get the most for your money make your own comparison

A few essential specifications of the heavy-duty 45 are listed here so you can compare them with other ¾ yard shovels. Make your own comparison and you will buy BAY CITY for the biggest value in excavating and material handling equipment. Let's get acquainted — Write for catalog today. BAY CITY SHOVELS INC., Bay City, Michigan

	BAY CITY MODEL 45	Other ¾ Yd. Shovels
WEIGHT	45,000 lbs.	
POWER	81 HP @ 1200	
ENGINE DISPLACEMENT	317 Cu. In.	
SHOVEL BOOM	19'-0"	
CROWD	One-piece Chain	
DIGGING RADIUS 45°	28'-1"	
CRANE BOOM (STD)	35' Pin-connected	
CRANE CAPACITY, 10' RAD.	27,300 lbs.	
BASES	Cast alloy steel	
GEARS	Helical Cut	
CLUTCHES	Mechanical power	
CRAWLER LENGTH	12' 6"	

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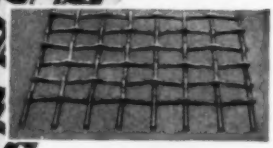
SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

for space cloth that's SUPER-TIGHT

and SUPER·TOUGH

specify SUPER-TEMPERED PRECISION SCREENS



For really tough jobs . . . where screens must stay tight and accurate under terrific punishment . . . you can't beat SUPER-TEMPERED Precision Screens.

Made from super-tempered steel, and woven on specially designed hydraulic looms, SUPER-TEMPERED Precision Screens have been subjected to the severest operating conditions in scores of plants and acclaimed the longest-wearing, most economical wire cloth made.

On your next order, specify SUPER-TEMPERED Precision Screens. Test them against your present screens and discover how they cut maintenance costs to minimum proportions. Write our nearest office for full details.

SUPER-TEMPERED PRECISION SCREENS

CF&I

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL & IRON CORP.

Sales Office and Plant — Clinton, Mass. *Branch Offices in Key Cities*

SUPER-TEMPERED Precision Screens are available in any length required for vibrating screen or trommel; with welded, hooked or reinforced edge to fit any type of vibrator.

Performance in the Pits by INTERNATIONAL

"POWER ON WHEELS"

"POWER ON TRACKS"

Clay from the pit rolls to the brick plant behind an International ID-9 wheel tractor. Teamed with a 4-yard wheel scraper, the ID-9 moves the clay over 1,000 yard hauls swiftly and at low cost for the Roanoke-Webster Brick Company of Roanoke, Va. The ID-9's performance proves that International "Power on Wheels" pays off in production.

Across the nation, near Vaughn, Montana, an International TD-9—rugged "Power on Tracks"—with a matched front-end loader, works for quarry-owner Walter Sack. The compact, maneuverable TD-9 loads crushed and washed rock from stockpiles into trucks at the rate of 100 tons per hour.

"Our truckers say this is the best outfit that ever put on a load for them. We agree. This little unit is just that," says Mr. Sack.

Whether it's crawlers, wheel tractors or power units, your International Industrial Power Distributor can furnish you with power that will more than pay off in productive work. See him now for International "Power on Wheels," "Power on Tracks," and "Power on The Job," with diesel or carbureted engines.

INTERNATIONAL HARVESTER COMPANY
Chicago

Tune in
James Melton and "Harvest of Stars"
—NBC, Sunday afternoons.

Standardize on Power that Pays

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

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INDUSTRIAL POWER

DU PONT ANNOUNCES "NITRAMEX" No 2

for quarry and open-pit blasting

Charges of "Nitramex" No. 2 are detonated with a "Nitramon" Primer. Note ingenious method of securing "Primacord."

"Nitramex"* No. 2 is another product of Du Pont Explosives Research . . . introduced now after extensive field tests have proved its value in blasting both rock and ore. It fulfills the need for a high-density blasting agent that develops its pressure more slowly, yet offers all the safety factors of "Nitramex," which has been used so successfully in ore and quarry applications.

The slower development of pressure . . . characteristic of "Nitramex" No. 2 . . . produces a better spreading action, giving more uniform fragmentation under a wider variety of conditions. This action frequently allows an increase in spacing and burden with as good or better fragmentation, saving both drilling and blasting costs.

The introduction of "Nitramex" No. 2 rounds out the line of "Nitramon"**–"Nitramex" blasting agents and marks another step forward in the Du Pont Company's program for safer blasting in quarries and open pits.

Ask your Du Pont Explosives Representative about this new, more effective blasting agent. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT "NITRAMEX"

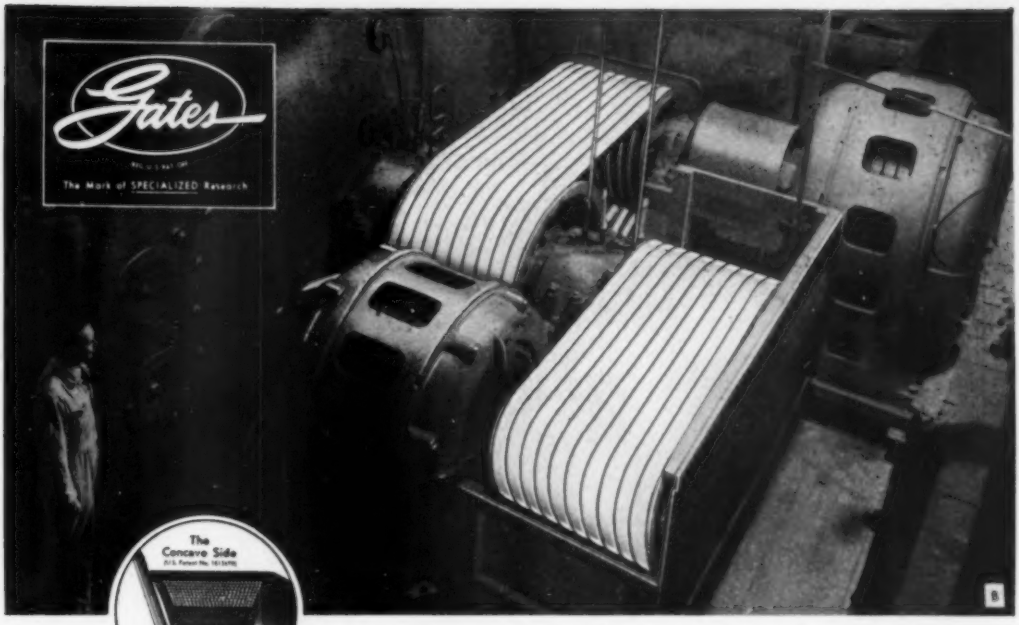
Not currently for sale in the western states.

*Reg. trade mark for ammonium nitrate blasting agent
**Reg. trade mark for nitrocarbonitrate blasting agent

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

This splendid fragmentation is typical of "Nitramex" No. 2 blasts.



The motor in the background transmits 600 horsepower through a hollow shaft to one impeller of this crusher while the motor in the foreground transmits 400 horsepower to the other impeller turning it in the opposite direction. The Gates Vulco Ropes absorb the terrific shocks encountered when hard copper ores are crushed between these impellers—are not bothered by the dust condition present.

Here is exactly ***WHY*** the Concave Side Saves You Money in V-Belt Costs

When *any* V-belt bends in going around its pulley, it is forced to *change* its *shape*.

Naturally so, because the top of the belt is under tension and grows *narrower* while the body, under compression, *bulges out!*

This change of shape in a *straight-sided* V-Belt, is shown in figures 1 and 1-A—and you will note how the bulging sides press *unevenly* against the V-pulley.

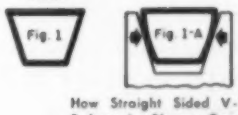
Now look at figures 2 and 2-A. There you see how this change of shape, due to bending, affects the belt that is built with the Concave Side—the Gates Vulco Rope. The precisely engineered Concave Side exactly corrects the side-bulge—and the bent belt *has a shape that exactly fits its sheave groove!*

Two distinct savings result. *First*—There is no side-bulge to cause uneven wear. The sides press *evenly* against the V pulley and therefore wear *uniformly*—resulting in *longer life!* Second—The *full width* of the sidewall grips the pulley—thus carrying heavier loads without slippage—and this *saves belts* and also saves *power!*

When you buy V-Belts, be sure you get the V-Belt with the Concave Sides... the Gates Vulco Rope!

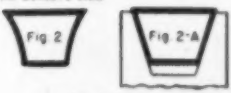
What Happens When a V-Belt Bends

Straight-Sided V-Belt



How Straight Sided V-Belt Bulges in Sheave-Groove. Sides Press **Unevenly** Against V-Pulley Causing **Extra Wear** at Point Shown By Arrows.

Gates Vulco Rope with Concave Side



No Side Bulge. Precise Fit in Sheave Groove. Sides Press **Evenly** Against V-Pulley—Uniform Wear—Longer Life!

CS-505

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Let your records tell you!

It's no news that the true cost of wire rope cannot be reckoned by purchase price alone. As we've so often pointed out, the real cost is the cost per unit of work it does.

In the case of Bethlehem rope, this figure will be *low*, and you will therefore have an economical rope. But we strongly suggest that *you* prove this to your own satisfaction. Keep some simple records; something to show, for instance, the rope costs per ton-mile in oil-country drilling . . . or per car of coal hauled up a slope . . . or per cubic yard of rock moved, etc. Pick the most convenient unit of work applicable to your business. It isn't at all difficult or complicated.

Then, study your records every so often. They'll tell you, far more convincingly than we can, that Bethlehem wire rope is an *economical* rope.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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A New PAYLOADER

model **HE** ½ yard

. . . with All the PAYLOADER Advantages

- Loads big trucks
- Four forward and four *faster* reverse speeds up to 23 mph.
- Separate, quick forward-reverse shift
- Full hydraulic control of bucket — lift, dump, close, lower
- Automatic quick tip-back of bucket
- Powerful hydraulic digging action
- Stability and maneuverability for fast, safe operation in close quarters
- Full visibility for the operator
- Large earthmover tires for maximum traction on and off pavements

Here is a new HOUGH PAYLOADER — a new size of PAYLOADER — that sets new standards of performance, usefulness and durability for ½ yard tractor shovels. It's got all the features and advantages that have made Payloaders top choice with contracting, industrial and public works buyers — an integral design of tractor and loader completely Hough-built, with a combination of traction, flotation, operating speed, maneuverability and over-all usefulness that opens new and wider fields of service for tractor shovels.

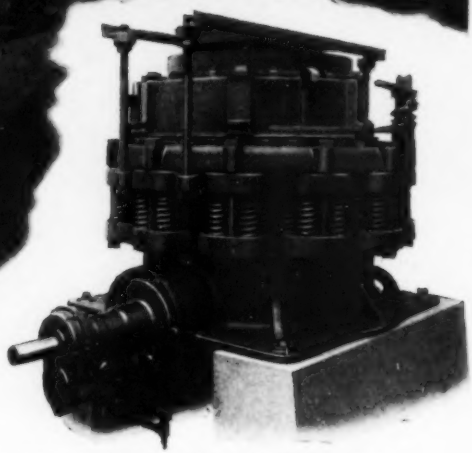
Your Hough Payloader Distributor is eager to put this brilliant performer through its paces for you. See him today or write . . . The Frank G. Hough Co., 750 Sunnyside Avenue, Libertyville, Illinois.

Send for catalogs on the new ½ yard HE Payloader or any others — the 12 cu. ft. HA, the ¾ yd. HF, the 1¼ yd. HL, or the big 4 wheel drive 1½ yd. HM.

HOUGH
PAYLOADER
Manufactured by THE FRANK G. HOUGH CO.

QUANTITY and QUALITY MATERIALS PRODUCTION for TODAY'S HIGHWAYS

COURTESY NEW JERSEY STATE HIGHWAY DEPARTMENT



If you have a newly built plant equipped with Symons Cone Crushers or one modernized by the installation of Cones, then your plant is prepared to meet the demand for materials arising from the construction of modern highways. For quantity production of finely crushed materials, no crusher has ever approached the performance of the Cone. This crusher is equally outstanding for making quality materials in the finer sizes for aggregate and as required for bituminous type roads. If your plant is not equipped for producing in capacity these sizes for which there is an ever growing demand, follow the example of leading producers everywhere who do their reduction crushing with Symons Cones.

Whether your fine crushing demands are but a few tons an hour or a major operation of hundreds of tons, there is a Symons Cone that will exactly meet your needs for tonnage and product. In addition to reduction crushers, Nordberg also builds primary crushers of the heavy duty jaw and gyratory types. If you have a crushing problem, submit it to Nordberg for solution.

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

NEW YORK • SAN FRANCISCO • WASHINGTON • LONDON • TORONTO • JOHANNESBURG

SYMONS CONE CRUSHERS

"...we used to let jobs go by...now with our LORAIN on rubber we really move around"

DIAMOND GRIT COMPANY
BALTIMORE, MARYLAND
tried a new idea when they bought their new Lorain rubber-tire Self-Propelled shovel. Other operators were skeptical about Diamond's departure from traditional crawler mounting... but President W. E. Thomas tells below how Lorain rubber-tire mobility has paid off . . .

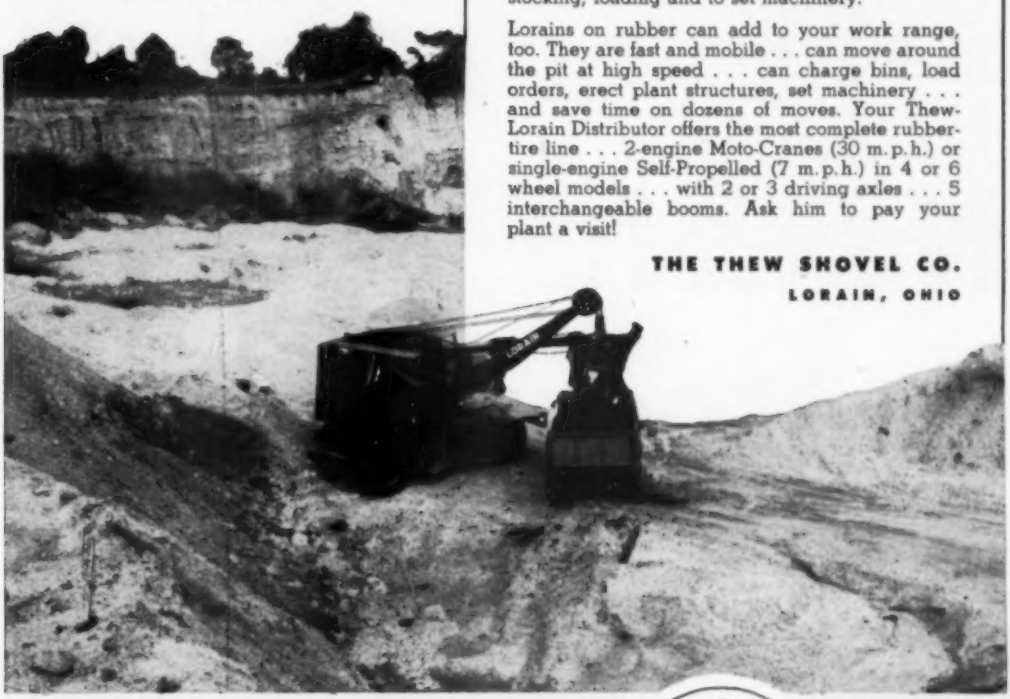
DIAMOND GRIT CO. operate one plant, covering about 30 acres with 2 separate pits . . . and needed a mobile shovel to move readily back and forth between the two. With their Lorain, they dig sand, gravel, clay, dirt and occasional streaks of tough iron ore. A Lorain on rubber saves time and money for them . . . and does the job better!

"Like a lot of smaller concerns, we do not have separate pieces of equipment to do each job, and formerly we let lots of jobs go by because we hesitated to move our crawler equipment from place to place. *It was my desire for years to have a piece of equipment we could really move around at will.*

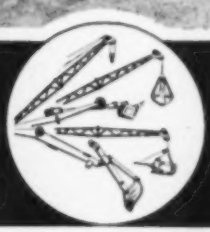
We now have it in our Lorain Self-Propelled shovel and use it to supply the plant, stripping, stocking, loading and to set machinery."

Lorains on rubber can add to your work range, too. They are fast and mobile . . . can move around the pit at high speed . . . can charge bins, load orders, erect plant structures, set machinery . . . and save time on dozens of moves. Your Thew-Lorain Distributor offers the most complete rubber-tire line . . . 2-engine Moto-Cranes (30 m.p.h.) or single-engine Self-Propelled (7 m.p.h.) in 4 or 6 wheel models . . . with 2 or 3 driving axles . . . 5 interchangeable booms. Ask him to pay your plant a visit!

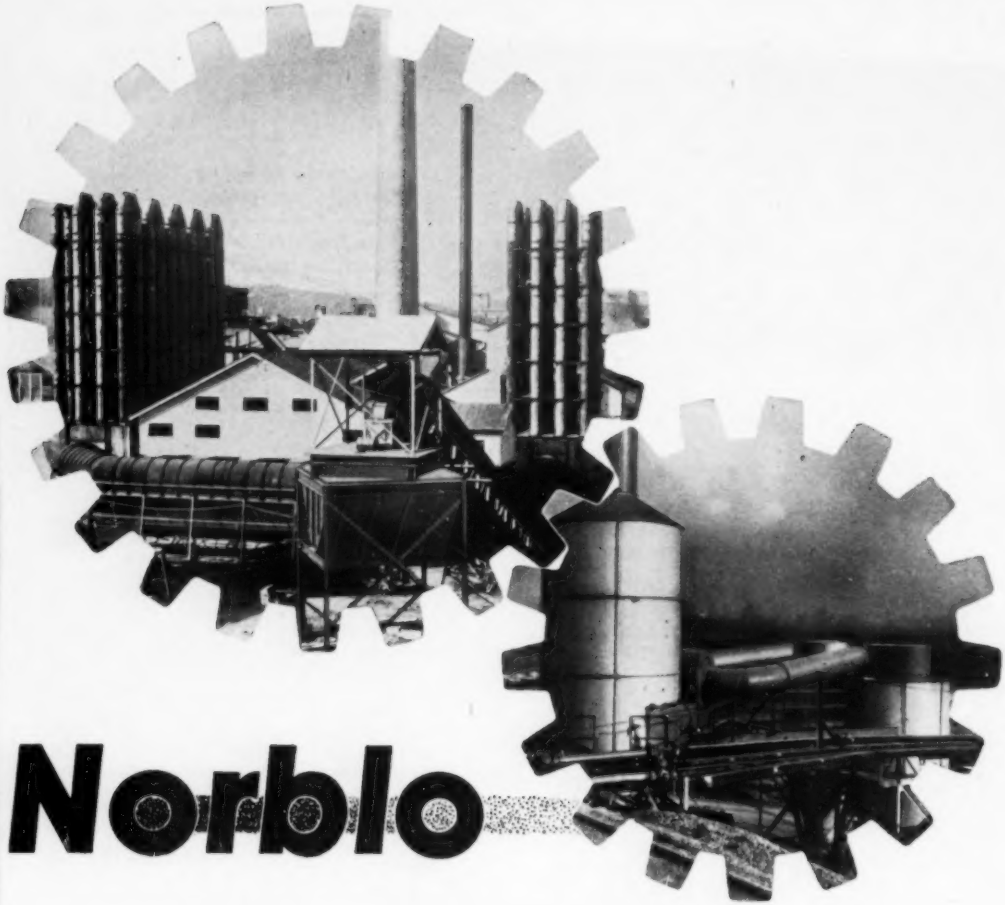
THE THEW SHOVEL CO.
LORAIN, OHIO



THEW **LORAIN** on CRAWLER or RUBBER



SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES



Norblo

Heavy Duty

DUST AND FUME COLLECTION

With three types of dust collectors — automatic bag, centrifugal and hydraulic — Norblo installations are geared to the heavy duty requirements of the smelting, mining, cement and rock products, foundry, chemical and milling industries.

Norblo Automatic Bag Type dust and fume collectors are outstanding in performance in continuous operation. These units are adjustable for varying dust load without shutting down. The periodic short cycle cleaning, automatically controlled, insures sustained collection efficiency at maximum. May we send you a handy Norblo Airflow Calculator — no obligation.

The Northern Blower Company

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Automatic and Standard Bag Type Fume and Dust Collectors • Norblo Centrifugal and Hydraulic Collectors • Cement Air Cooling Systems • Exhaust Fans

The Work Horse in the packaging field

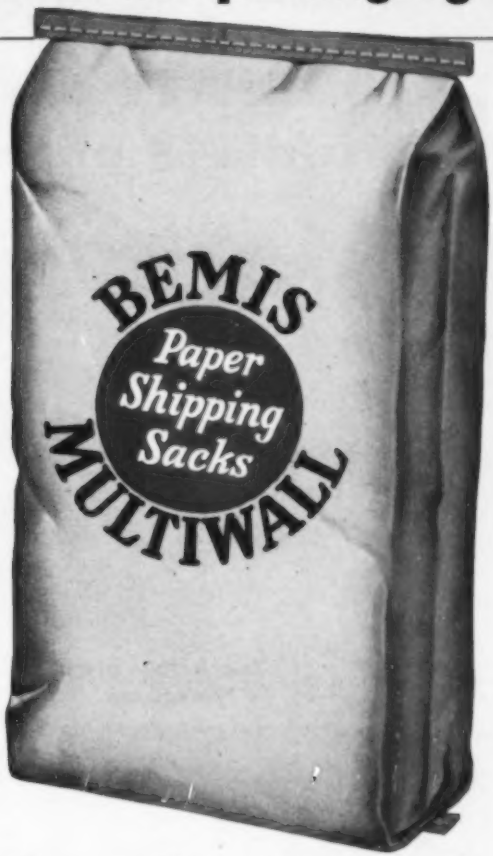
BEMIS

MULTIWALL

PAPER

SHIPPING

SACKS



They're tough and sturdy . . . have plenty of reserve strength even when packed with such heavyweights as cement or fertilizer.

Bemis uses top quality kraft paper. Each of the three or more plies has been tested for the kind of work it must do. So, there is never any question. It's sure to do the job.

Seven Bemis Multiwall Plants are ready to team up to give you service in an emergency or to provide a dependable source of supply.

Bemis

Now you can get LIMA

DEPENDABILITY and STAMINA plus the MOBILITY of Rubber Mounting

3 TYPES

Wheel-Mounted "Paymaster"

- Convertible Crane, Shovel, Dragline or Pull Shovel
- Powered by one engine
- One Operator Control — including travel
- Crane Capacity 20 tons (with outriggers)
- Shovel Capacity ¾ or 1 yard
- Travel Speed (maximum) 8.24 M.P.H.

Truck-Mounted "Paymaster"

- Convertible Crane, Shovel, Dragline or Pull Shovel
- Separate engine for travel
- Requires two operators
- Crane Capacity 20 tons (with outriggers)
- Shovel Capacity ¾ or 1 yard
- Travel Speed (maximum) 31 M.P.H.

Wheel-Mounted Crane or Clamshell

- Powered by one engine
- One Operator Control, including travel
- Crane Capacity . . . 35 tons
- Travel Speed (maximum) 5.27 M.P.H.

With these three rubber-mounted units you can now get all the other advantages of LIMA equipment – greater performance, less "down-time", longer life, etc.—*plus* the added benefits of greater mobility, less travel time, and better maneuverability. Rotating assemblies have the same basic features as corresponding crawler machines, with alterations adapting them to truck or wheel mounting. With outriggers supported, they provide extra capacity. They are ideal for operations requiring constant movement around the job, for small scattered jobs, or jobs remotely located.

THE LIMA LINE NOW INCLUDES:

Crawler-Mounted	*Rubber-Mounted*
Shovels, ¾ to 6 yds.	Shovels, ¾ and 1 yd.
Cranes, to 110 tons	Cranes, to 35 tons
Draglines, variable	Draglines, variable

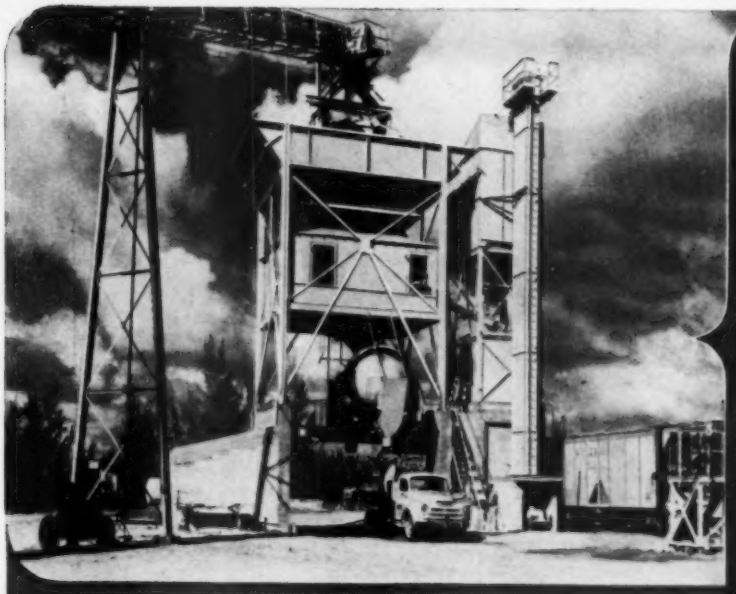
Offices are located in the principal cities of the U. S. and the world. If you do not know the representative nearest you, write us and we'll tell you where to reach him.

Lima Shovel and Crane Division

LIMA, OHIO

OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*

LIMA HAMILTON CORPORATION



MODERN ERIE Wet and Dry Batch Concrete Plant

Plant includes Type CTB 160 Cu. Yds. 3-Compartment Aggre-Meter Plant connected to an M-3 492 Bbl. Single Compartment Cement Plant loaded from under-track hopper to 50 T.H.P. Elevator. This 3 yard wet and dry batch Central-Mix Plant produces up to 500 yards of concrete per day to supply the Miami market.

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PRECISION batching of high grade materials assures the high quality of specification concrete. The combination of efficient handling and accurate batching speeds concrete output and lowers cost. Consult Erie for thrifty storage and batching of cement, sand and aggregates.

Barges of sand and reduced oolitic limestone are unloaded by clamshell into hopper and belt conveyed to 3-Compartment Erie Bin.

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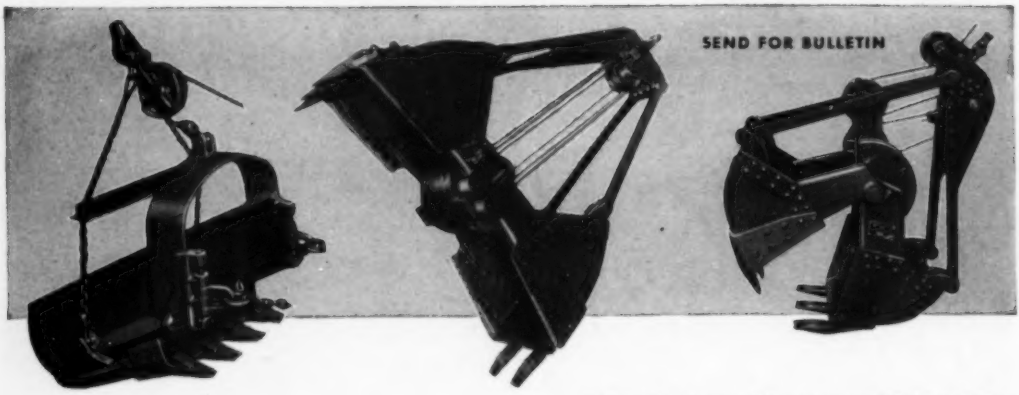

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Williams Type **BUCKETS**

● Count on longer life and more efficient service ... due to Wellman original **welded rolled steel construction.** You get the maximum digging power, and exceptional strength—without excessive weight! Specify Wellman, and you'll specify the best bucket for your purpose.

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Centrifugal Dust Collectors.
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480 CFM to 69000 CFM.

Of Various Metals from No. 22 to and including No. 7 gauge.

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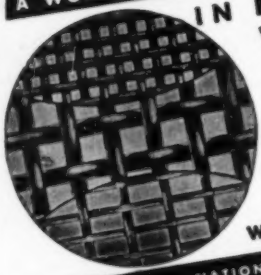
Industry has
A WORLD OF CONFIDENCE
IN NAT-ALOY
WIRE CLOTH



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. . . for a dependable, long-wearing, non-crystallizing Screen Cloth. Has "Nat-Aloy" Lock Crimp Meshes. Preferred for screening accuracy, economy and serviceability. All Sizes — All Meshes — All Gauges.

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NATIONAL WIRE CLOTH CO., INC.
St. Paul, Minn.

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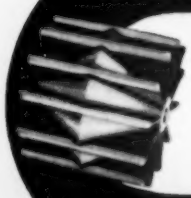
increases belt life up to 400%*



Belt Saver
PULLEY

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MUNCY PENNSYLVANIA

* Based on users' reports

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PIT QUARRY

the fast,

low-cost way

to get

worn teeth

back in service!

1. Worn tooth . . . 2. Plus AMSCO Tooth Repointer . . . 3. Equals like-new tooth—ready for service!

AMSCO® tooth repointers

AMSCO Repointer Bars

3 teeth partially rebuilt with AMSCO Repointer Bars to show sectional view of welding method. These Repointer, or Wedge Bars, are also made in many shapes and sizes. Apply AMSCO Economy Hardface to the rebuilt tooth *—for as much as 3 times longer service!*

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Vol. 42 MAY 1950 No. 11

PIT AND QUARRY

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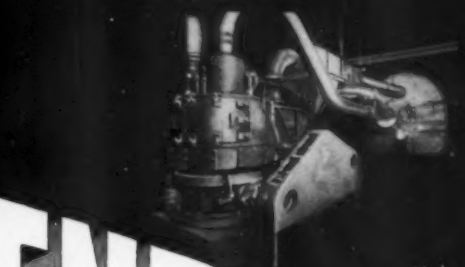

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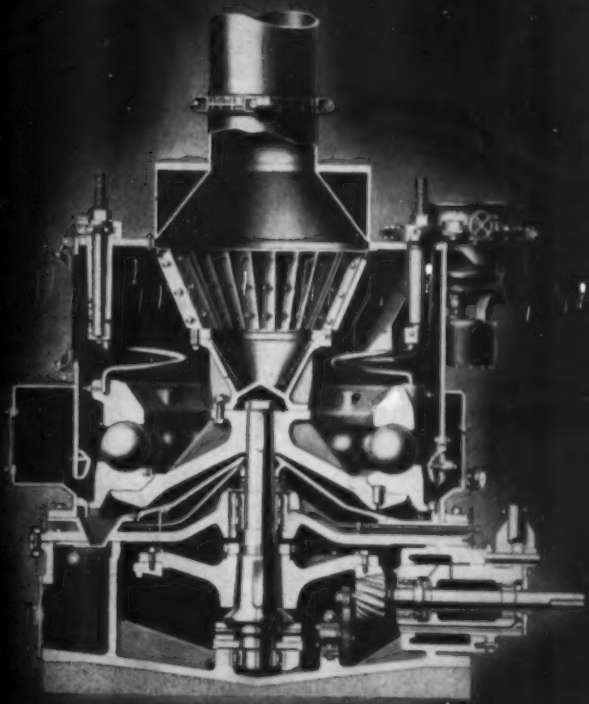

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editorial

The End of Pollution Is In Sight

THE drive against pollution, which had made comparatively slow progress up to the end of the war, has rapidly gained in momentum in the last few years; and the time is now coming near when no-one—municipality, industry or individual—will be allowed to pollute the water or air which are our common property. Mankind has, through the centuries, eliminated or modified one after another of the many hazards to our health, safety, and comfort. Some of this has been accomplished by educating the individual, some by advancements in science, medicine, engineering, etc., and some by government regulation. Adequate equipment and methods are now available to fully eliminate air and stream pollution from any source; but actual elimination, heretofore largely voluntary, has lagged. The voluntary period, apparently, is now nearly over, and cities, states, groups of states, and the federal government are taking one step after another against such pollution.

Stream pollution received its death blow late in 1948, when the Congress, after nearly 50 years of controversy, finally approved federal control of such pollution. The new Barkley-Taft Water Pollution Act gave the U. S. Public Health Service authority and funds to survey the nation's rivers, streams, and lakes. Polluters are being ordered to clean up their discharged wastes; and if corrective steps are not taken, the federal government, with the approval of the state, may sue non-cooperators. Funds are also made available to assist states, cities, and other public agencies in making their own investigations and for loans to assist them in building treatment and corrective facilities. This program has made rapid progress, and the end of water pollution in this country is in sight.

THE control of air pollution has not progressed as far, but all indications point to rapid progress from now on. An indication of the growing interest of government in this subject is the announcement by Secretary of the Interior Oscar L. Chapman, that the first-government-sponsored conference on air pollution will be held in Washington May 3-5. At this conference air pollution and its effects will be discussed from every angle. Some definite regulatory action to control this hazard is almost sure to follow.

One of many examples of the interest in this subject at the state level is the recent announcement that the state of Pennsylvania now has a new air pollution and industrial hygiene mobile laboratory, the first of its kind in this country. This laboratory is equipped with numerous devices for field sampling and quantitative and qualitative analyses of atmosphere in industrial communities and factories. Operation of the laboratory will be under supervision of the state's new Air Pollution Division of the Industrial Hygiene Bureau.

THAT cities throughout the country, in or near which dust-creating or air-contaminating plants are located, are awakening to the fact that such dust nuisances can be largely eliminated is evident from an article in the April, 1950, issue of *The American City*, a publication circulated among officials of cities, towns, and villages. This article, by the city clerk of a community of about 4,000 people, many of whom depend for a living on its two cement plants, tells how the Mayor conducted a survey of what other cities have done or are doing to eliminate or control cement dust. Inquiries were sent only to communities of over 1000 population, as it was assumed that in smaller communities, depending almost entirely on a cement plant for subsistence, municipal officials would be unlikely to begin agitation for the correction of a dust nuisance.

Inquiries were sent to 52 cities and 40 answers were received which brought out many interesting facts. One was that even a wet process plant can emit large volumes of dust. It was also surprising to note how many cities of all sizes have no dust ordinances, the largest in this class having a population of over 300,000. On the other hand some much smaller communities do have dust control ordinances, and others will soon have them. Even where there are ordinances, however, not all plants have taken steps to eliminate dust, and in several cases long-drawn out litigation has resulted. It is gratifying, however, to know that most cement companies confronted with this problem have already taken steps to control the dust nuisance, and others are preparing to take such steps.

PRODUCERS of nonmetallic minerals as a whole, are comparatively unimportant factors in stream pollution, as their wastes are largely inert materials. The wastes they have discharged into streams have consisted largely of sand, silt, and other materials which do not pollute but which tend to settle out and impede the necessary free flow of water in these streams. As we have pointed out many times in these pages, the nonmetallic minerals producer's solution to this problem is in most cases comparatively simple and inexpensive.

In the pollution of air these industries are apparently a much more important factor. The dust many of them create is not poisonous but, in some cases, it is detrimental to health. This dust is, however, a very obvious nuisance and is unquestionably detrimental to the locality in which such an operation is located, and to the comfort of those working in or living near the plant. All indications are that industries having dust nuisances which do not correct them voluntarily may soon be forced to do so. Much good will can be gained among employees, neighbors, and in many cases among customers by taking adequate steps as soon as possible.

Walter E. Trasker

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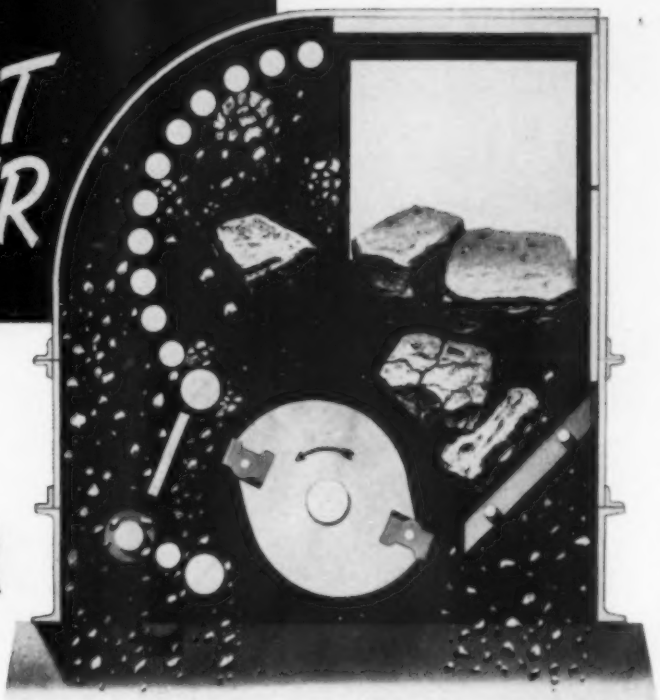

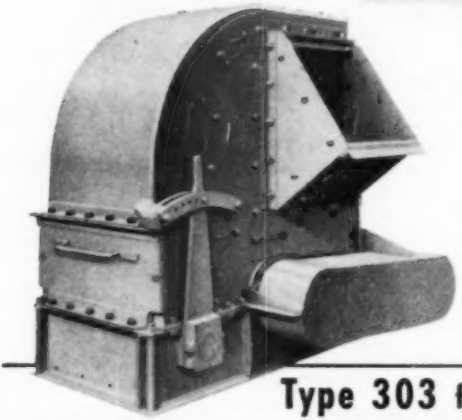

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news of the industry

PIT AND QUARRY

General Portland Cement Reports Increased Output, Plans Further Expansion

General Portland Cement Company plans to continue its program of expansion and improvement of its properties in 1950, according to the company's annual report. The Dallas, Tex., plant is to be substantially improved, with initial field construction already under way and orders placed for machinery and equipment. It is expected that the new equipment will be in operation at Dallas late this year. Improvements are to continue at four other plants in Houston and Fort Worth, Tex.; Tampa, Fla.; and Chattanooga, Tenn.

Smith W. Storey, president, declared in his letter to stockholders that increased production and higher earnings in 1949 are attributable to the company's improvement program. Since the organization of General Portland Cement Company on February 19, 1947, expenditures for this program have totaled approximately $5,200,000.

Mr. Storey said that these continuing improvements have increased the company's annual productive capacity for regular Type I portland cement from 6,635,000 barrels at the beginning of 1947 to approximately 8,885,000 barrels at the end of 1949. The firm's present capacity, Mr. Storey pointed out, is about one-third greater than the capacity at the time of the company's formation.

General Portland Cement's net earnings as of December 31, 1949, totaled $5,239,900, as compared with $4,273,000 in 1948. Based on 1,037,387 shares of common stock outstanding, earnings represented $5.05 per share in 1949, as compared with $4.12 in 1948. Dividends totaling $2.50 per share were paid in 1949, and $1.50 per share was paid in 1948. Net sales in 1949 were $21,285,300, as compared with $19,491,000 in 1948.

N.L.A. Safety Contest Shows '49 Safest Year for Industry

According to an announcement released by the National Lime Association, the 1949 N.L.A. safety contest showed that 1949 had been the safest year for the lime industry in the 15-year history of the contest. This encouraging opinion was announced by the association, although the compilation of data had not yet been verified by the Accident Analysis Division of the Bureau of Mines, through which the N.L.A. conducts the contest.

Not since 1935, until the year just past, it was declared, have the participating plants (36 during 1949) reported no fatalities. Moreover, records show that there were no permanent total disabilities, and only one permanent partial disability. In contrast to the picture presented by averages during previous contest years—fatalities, 2.8 per year and permanent partial disabilities 5.9 per year—the 1949 record is outstanding.

N.L.A. tabulations indicate that 11 plants went through the year without a lost-time accident. Winners of the contest will be announced in the near future.

Coming Events

May 11-13, 1950—Hot Springs, Va. Annual spring convention, National Lime Association, The Homestead.

May 17-19, 1950—Hot Springs, Va. 15th annual meeting, National Industrial Sand Association, The Homestead.

June 26-30, 1950—Atlantic City. 53rd annual meeting and ninth exhibit of testing apparatus and equipment, American Society for Testing Materials, Chalfonte-Haddon Hall.

July 19-20, 1950—Cincinnati. Midsummer meeting, National Agricultural Limestone Association, Netherland Plaza Hotel.

October 16-20, 1950—Chicago. 38th National Safety Congress and exposition, Stevens Hotel.

Ideal Cement Announces $3,500,000 Expansion Plan For Trident, Mont., Plant

In an announcement released by Cris Dobbins, executive vice-president of the Ideal Cement Company, it was disclosed that the Denver concern will spend $3,500,000 to raise the capacity of its Trident, Mont., plant to 2,200,000 bbls. per year. This program will more than double the present output rate.

Scheduled for completion on September 1 is the installation of grinding facilities which will bring capacity up to 1,250,000 bbls. annually. (Improvements at Trident in the last two years have raised the output from 600,000 to 1,000,000 bbls. per year.)

Later stages of the program are tentatively planned to be completed in 1951, 1952, and 1953, depending somewhat upon business conditions. Mr. Dobbins stated that the total projected capacity of 2,200,000 bbls. per year is at least 33 1/3 percent greater than the demand which can now be foreseen for the next ten years in this area.

The first unit operation calls for the construction of a mill building and the purchase and installation of modern finish grinding equipment, including a Traylor 8- by 30-ft. compartment mill, complete with an 800-hp. motor, elevators, separators, and Fuller-Kinyon pumping apparatus. There will also be a new power substation and a modern locker-wash-change house.

During the three later stages a new crushing and raw grinding department will be added; new kilns will be installed; and additional finished cement storage facilities, a laboratory, and other service buildings will be erected.

Available to members of the National Safety Council is the *1950 Directory of Occupational Safety Posters*, a 72-page, multicolor catalog presenting reproductions of 744 posters for use in various industries and occupations. Nonmembers may obtain the directory by applying to Membership Service, National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill. Price, 50 cents per copy.

Atlantic City to Entertain A.S.T.M. June 26-30 At 53rd Annual Meeting

A large number of technical papers and reports, including several symposiums, will be presented at the 53rd annual meeting of the American Society for Testing Materials in Atlantic City during the week of June 26, 1950. The ninth exhibit of testing apparatus and related equipment will also be in progress, as well as A.S.T.M.'s biennial photographic exhibit.

The meeting has many important features for all those concerned with materials. Hundreds of the technical committees will meet to complete their work on standards and to report on research developments. Many outstanding technical papers will be presented. There will be symposiums on the following subjects: *Effect of Sigma Phase on the Properties of Metals at Elevated Temperatures, Corrosion and Erosion of Gas Turbine Materials, Sampling of Bulk Materials, The Role of Non-Destructive Testing in the Economics of Production, Methods of Testing Soils Under Triaxial Loading, and Identification and Classification of Soils.*

The 1950 Marburg Lecture is to be given by Dr. Wallace R. Brode, associate director of the National Bureau of Standards, who will speak on spectroscopy as allied to testing and analysis of materials.

International Minerals Plans $4,000,000 Expansion Move

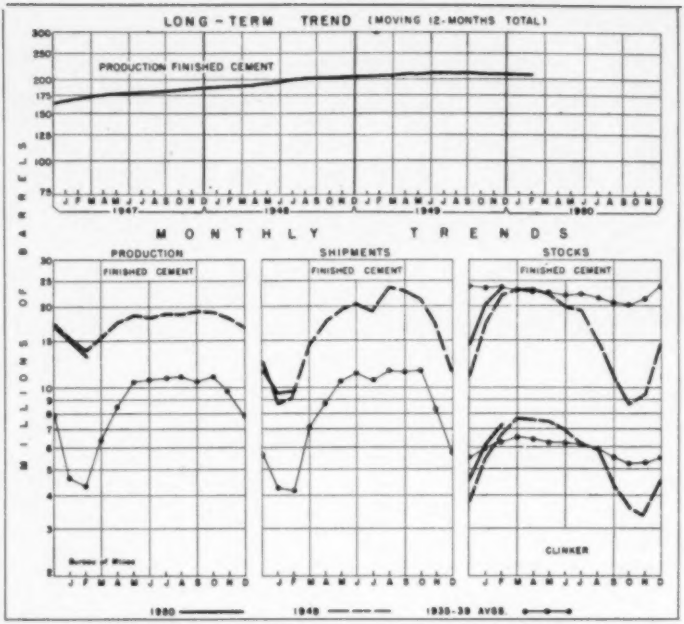
Plans for a $4,000,000 expansion project to be constructed by International Minerals and Chemical Corporation during the coming year at Bartow, Fla., were announced recently by Louis Ware, president.

The project will include a new office building to house Florida headquarters for the company's phosphate operations, since present headquarters at Mulberry have been outgrown.

The new office building and other structures to be erected will be located at or near the Noralyn mine, said to be the largest phosphate mine in the world, which the corporation put into operation just southwest of the Bartow city limits in April, 1948. That project was reported to have cost $11,000,000.

Mr. Ware stated that plans have been made for the construction of a multiple super-phosphate and phosphate chemicals plant, a large new sulphuric acid plant, a modern machine shop, an analytical laboratory, and a warehouse and service center to serve all of the company's Florida operations.

R. B. Fuller, manager, has announced that International Minerals and Chemical has started operating a new drying plant having an 9- by 80-ft. drying unit. The new facilities are integrated with the Noralyn mine and beneficiation plants to make a complete operation from matrix to railroad car.



SUMMARY—The portland cement industry produced 13,070,000 barrels of finished cement in February, 1950, as reported to the U. S. Bureau of Mines, a decrease of 5 percent as compared with the output in February, 1949. Mill shipments totaled 9,775,000 barrels—an increase of 7 percent over the February, 1949, figure, while stocks of 23,562,000 barrels were 6 percent greater than the total for the same month of 1949. Clinker production during February, 1950, amounted to 14,454,000 barrels—a decrease of 4 percent as compared with the corresponding month of the previous year.

PRODUCTION—The output of 13,070,000 barrels of finished cement during February, 1950, came from 142 plants located in 34 states and Puerto Rico. During the same month of the preceding year 13,751,000 barrels were produced in 144 plants. Clinker production decreased 4 percent as compared with the February, 1949, total.

SHIPMENTS—Mill shipments of 9,775,000 barrels were 7 percent greater than the February, 1949, total. The demand for cement, as indicated by shipments, increased over the previous month (January, 1950)—9,593,000 barrels. Shipments of cement were greater in 11 districts and lower in 8 districts than those reported in February, 1949. The changes range from a decrease of 26 percent in the eastern Pennsylvania-Maryland district to an increase of 109 percent in the Kansas district. An increase of 10 percent was noted in the Puerto Rican district.

STOCKS—Finished cement stocks of 23,562,000 barrels on February 28, 1950, were 6 percent above the February, 1949, figure, while clinker stocks as of the same date amounted to 7,311,000 barrels—an increase of 8 percent.

Soil-Cement Base Practical For Aggregate Stockpiles

Sand-and-gravel and crushed stone producers may have occasion to profit from the successful experiment recently carried out by the staff of the J. F. Bloomer Company, Appleton, Wis.

When the problem of stockpiling large yardages of road materials on soft ground throughout the winter and spring faced these contractors, they decided to floor the stockpile area with soil-cement—an 8 percent cement factor for the full depth and an additional 4 percent in the top 2 inches. The 3,100 square yards of base was completed at a cost of less than $2,500.

Kansas Cement Firms Agree To Meet New Specifications

Cement manufacturers of Kansas, after first refusing to supply contractors with a product ground to meet the new specifications of the Kansas State Highway Department, recently announced that they will now meet these standards. Their original stand resulted in the department's receiving no bids on a concrete road project.

Agreement to furnish the new type of cement to bidders on the job was indicated by six firms at no extra cost over standard portland cement. Bids were opened on March 14. The new cement is ground more coarsely than ordinary cement; it also has a lower tricalcium silicate content and limits the amount of free lime more closely.

According to a communication received from Peter Wright, secretary of The Associated Portland Cement Manufacturers, Ltd., London, England, the head office and administrative offices of the firm and its subsidiaries are now located at Portland House, Tothill Street, Westminster, S.W. 1.

Portland Cement Makers Of Mountain States Hold Safety Meeting at Denver

More than 40 men from portland cement mills and quarries in Colorado, Nebraska, and Wyoming attended one of a series of cement industry safety meetings on March 23 at the Brown Palace Hotel in Denver.

Presiding as chairman of the meeting, which featured addresses by state and federal officials, was S. A. Gretencourt, plant manager of the Colorado Division of the Ideal Cement Company, Portland, Colo.

Safety in driving, and accidents—their causes and methods of elimination—were discussed. The meeting, eleventh in a series of 22 held in the United States and Canada, was a part of an extended program to maintain the cement industry's position as one of the safest in the nation.

Among Colorado cement company officials attending were Cris Dobbins and Thomas B. Douglas of the Ideal Cement Company, Denver, and S. W. Russell, Monolith Portland Midwest Company, Denver.

Belle Fourche, Bentonite Plant Win 18-Year Utilities Battle

Belle Fourche, S. D., and the Eastern Clay Products Company's bentonite plant in that city recently figured prominently in a historic local event involving the transportation of natural gas over a common-carrier pipeline. Gas, owned by the Mondakota Gas Company and transported over the Montana-Dakota Utilities Company's pipeline from Baker, Mont., was turned on officially at the Eastern Clay Products plant for the first time after 18 years of litigation.

Declaration of the Montana-Dakota Utilities pipeline as a common carrier was made by the Federal Power Commission, ending nearly two decades of hearings and litigation with a decision in favor of the Mondakota Gas Company. The commission's decision compels Montana-Dakota Utilities to transport natural gas over its pipelines on a "workable" rate structure.

According to J. F. Wight, executive vice-president of Mondakota, the long legal and engineering battle has cost his firm approximately $1,000,000, but will go down as one of the most important decisions in the history of transportation. On behalf of Eastern Clay Products, Ken Arthur, manager, commended Mondakota officials for their perseverance in pushing the case to a successful conclusion.

N.A.L.A. Midsummer Meeting July 19-20 at Cincinnati

July 19 and 20 are the dates, Cincinnati's Netherland Plaza, the place for the National Agricultural Limestone Association's midsummer meeting.

On the first day the board of directors will meet, with association members admitted. The general session will follow on the second day. An interesting program has been prepared for the afternoon, and a cocktail hour and banquet will top off the day.

It is hoped that members will make a sincere effort to interest potential members in attending the session.

Photo by George Wheeler.

• This action photo of a spectacular fire at San Rafael, Calif., showing a gravel bunker in flames, was featured recently in newspapers throughout the country. The structure had been leased from the Cheda Company (out of business) by Emory A. Troth, Inc., for storage of material shipped in by barge via the canal on which the bunker is located. Damage was estimated to be between $100,000 and $150,000. Shown in this shot are the strenuous—and successful—efforts of volunteer firefighters to save a railroad car full of new trucks. At the upper right a power line worker is cutting lines to prevent trailing "live" wires. The origin of the blaze was not immediately determined.

Cover Picture....

• The Agricultural Limestone Division of Eastern Rock Products' Oriskany Falls, N. Y., plant processes 120 thousand tons of agstone, as part of the annual limestone capacity of 500 thousand tons. Shipments of agstone are made by truck or rail, bagged, in dry bulk, or mixed with about 5 percent moisture for truck spreaders. Using a continuous paddle mixer, mixing and loading of moist bulk is accomplished at the rate of 80 t.p.h. For full particulars on the plant see Pit and Quarry, May, 1945: New York Plant Meets Mounting Demand for Agstone by Adding New Equipment, by Walter E. Trauffer.

Western Machinery Forms Wemco Division by Merger

Harry N. How, president of Western Machinery Company, has announced the consolidation of the firm's Western-Knapp Engineering Division with its equipment manufacturing division. The merging of activities of the two organizations creates a new division of the firm to be known as the Wemco Division.

Business activities of the newly formed Wemco Division will be to manufacture and market the metallurgical equipment line known to industry as Wemco Products and to design and/or construct metallurgical and mineral processing and beneficiation plants.

Ralph B. Utt, formerly general sales manager, has been named general manager of the Wemco Division. Western Machinery Company home offices are at 760 Folsom Street, San Francisco.

Mineral Aggregates Assn. Of Indiana Holds 1950 Meeting

On February 23 and 24 the Indiana Mineral Aggregates Association, Inc., held its annual meeting in Indianapolis. A program of informative addresses was enjoyed and the excellent banquet was attended by 200 persons.

Elected to office for the coming year were the following: L. F. Hart (Wabash Sand and Gravel Company), president; E. L. Heckathorn (Stuntz-Yeoman Company), vice-president; and C. W. Siniff (American Aggregates Corporation), secretary-treasurer. The association's agricultural limestone committee, headed by Mr. Heckathorn, concerns itself actively with the problems of agstone producers. Ralph E. Simpson is engineer-director of the organization.

N.L.A. Convention Preview Assures Excellent Program Featuring Top Speakers

Program plans are now almost completed for the 48th annual convention of the National Lime Association scheduled for May 11-13, 1950, at The Homestead, Hot Springs, Va. As has been the policy for the past few years, the convention is closed to all others except National Lime Association members and invited guests. The program is unusually diversified this year, with subjects ranging from general business problems to developments on important lime markets and reports on the results of N.L.A. research fellowships in various marketing fields. As in the past, ladies are cordially invited to attend. A brief digest of the program follows.

The report on the National Lime Association's activities and accomplishments during the past year will be presented by Robert S. Boynton, general manager.

A paper covering the use of lime in insecticides will be presented by Dr. E. E. Fleck, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.

H. M. (Hank) Beatty, formerly vice-president in charge of production of The Kelley Island Lime & Transport Company, and now a pension consultant, will speak on the pension problem in the lime industry.

From the Union of South Africa, there will be T. L. Webb, who is currently engaged in research for the building lime industry of South Africa. Mr. Webb will have some interesting facts to relate concerning the South African lime industry.

The association has scheduled Harry Strain, director of raw material, fuel and power, United States Steel Corporation, who will review the recent changes and those still anticipated in the steel industry. It is expected that Mr. Strain will report on recent research on the addition of quicklime at the tuyeres in the blast furnace and other interesting developments.

An old-time favorite of the National Lime Association will be on hand—Dr. Firman E. Bear, head of the Soils Department, New Jersey Agricultural Experiment Station. Dr. Bear will report on the accomplishment obtained from the recent four-year agricultural liming research program at five agricultural experiment stations.

In the field of trade wastes, Hayse H. Black, chief of the industrial wastes section, Survey & Investigation Branch, U. S. Public Health Service, Cincinnati, O., has been scheduled to report on federal stream pollution abatement activity as a result of the fairly recent Federal Pollution Law.

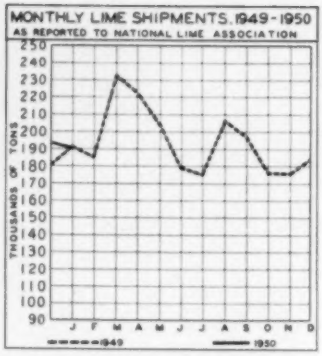
Representing the new, intriguing market of road stabilization will be Professor K. B. Woods, Department of Highway Engineering, Purdue University, who will report on the results of the current N.L.A. research program on this subject under his direction. He will have some interesting facts to report on how the frost resistance of lime stabilization can be improved.

Dr. Willem Rudolfs, head of the Department of Sanitation, Rutgers University, will report on another N.L.A. fellowship in the rapidly growing field of sewage and trade wastes treatment.

Lastly, Professor James A. Murray of the Massachusetts Institute of Technology will present the most interesting research report to date concerning the N.L.A. research fellowship at M.I.T. on a fundamental study of lime. Following his paper, there will be an open discussion and an evaluation of this report.

Entertainment features will include a bingo party with special prizes for the ladies and $$ for the men.

• Don't turn her down on Poppy Day.



According to data collected by the National Lime Association, 48 companies in January, 1950, shipped 190,379 tons of lime (125,185 quicklime; 65,194 hydrate). Reporting companies represent 58.9 percent of the association members' total capacity of record. Based on Pit and Quarry's estimate for the remainder of the industry, the total shipments for the month by all plants were approximately 355,500 tons. Shipments by uses and grades for January, 1950, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	1,383	7,368
Building	11,453	31,436
Chemical	112,349	26,390
Total	125,185	65,194

March and First Quarter Buildings Totals Set New Volume, Dollar Records

Setting a new all-time high for monthly construction volume, the March total of building and engineering contracts awarded in the 37 states east of the Rocky Mountains, was $1,300,201,000, according to the F. W. Dodge Corporation. The former high record figure was $1,190,264,000 reached in June of wartime 1942. The March total was 67 percent ahead of the preceding month and 74 percent greater than the March, 1949, total.

The quarter just closed also reached a new first quarter record, exceeding all previous first quarter totals in both dollar volume and physical volume. During the first three months of this year contracts were awarded for building and heavy engineering works for the total of $2,810,586,000, and providing for 245,207,000 square feet of new building space. The quarter's total surpassed the previous record dollar volume of $1,986,936,000 recorded for the corresponding period of last year and the 220,654,000 square feet total, the previous new floor space record set in the first quarter of 1928. The three-month total contract award volume was 56 percent ahead of last year's corresponding total.

Residential operations, aggregating $1,279,634,000, showed the largest first-quarter increase, more than doubling last year's total. Nonresidential projects, which totaled $1,001,519,000, were 30 percent ahead of last year, while heavy engineering rose 25 percent to $529,433,000 this year.

Comparing the March figures with those of March, 1949, residential contract awards again showed the largest gain, a 128 percent rise, followed by nonresidential with a 53 percent increase and heavy engineering, which was up 34 percent. Residential awards accounted for $574,681,000 of last month's total, with nonresidential awards totaling $500,658,000 and heavy engineering $224,862,000. All these classifications showed substantial increases over the preceding month.

Nonmetallic Minerals Men Attend Council Meeting

Among those attending the National Minerals Advisory Council meeting held recently in Washington, D. C., were the following: H. M. Albright, president, U. S. Potash Company, New York; Philip L. Corson, president, G. and W. H. Corson, Inc., Plymouth Meeting, Pa.; Wilber Judson, Texas Gulf Sulphur Company, New York; William W. Mein Jr., vice-president, Calaveras Cement Company, San Francisco, Calif.; and Louis Ware, president, International Minerals and Chemical Corporation, Chicago, Ill.

The council was organized in 1947 to advise the Department of the Interior on policies and programs relating to the mineral supply position of the United States.

Lone Star's 16th Plant To Be Built at Roanoke— 1,500,000 bbl. Yearly Output

The Lone Star Cement Corporation has announced that it will construct a new cement plant near Roanoke, Va. These facilities, to be erected at a cost of $6,000,000, will have an annual productive capacity of 1,500,000 bbls. of cement and should be in operation early in 1951.

The plant will be erected about nine miles from Cloverdale, Va., and will be served by the Cloverdale and Catawba Railroad, a subsidiary of Lone Star. Construction of this railroad was recently completed by the Walsh Construction Company of New York and the Ralph E. Mills Company of Salem, Va.; and these contractors are now rushing construction of the new plant. Silos and packhouse will be constructed by the Macdonald Engineering Company of Chicago.

Lone Star has for many years operated a plant at Norfolk, Va., and the new mill will make additional cement economically available to the Virginia and Carolina areas.

With a present total annual capacity of 27,500,000 bbls., Lone Star ranks as one of the nation's largest cement manufacturers. In addition to ten plants in the United States, its subsidiaries own and operate five plants in Cuba, Argentina, Brazil, and Uruguay. The new plant will bring to 16 the total number of mills in the Lone Star system.

E. J. Brunenkant Joins Staff Of N.A.L.A. in Washington

Edward J. Brunenkant Jr., for the last three years a field editor on PIT AND QUARRY's editorial staff, has accepted a position with the National Agricultural Limestone Assn., Inc., Washington, D. C., as assistant to Robert M. Koch, executive secretary. According to Vincent H. Shea, president of the association, the amount of work confronting the secretary has increased rapidly during the past three years, and there is a feeling among the members that more promotional work should be done.

Ed Brunenkant attended the University of Michigan, where he majored in engineering, after which he spent 3½ years in the Military Intelligence Service, both in this country and abroad. During his years with PIT AND QUARRY he studied for a law degree at night school, a subject which should be valuable in his new connection. He will take up his new duties in June.

The entire staff of PIT AND QUARRY wishes him and the N.A.L.A. well in this new connection.

Edward J. Brunenkant, Jr.

● A Marion Type 33-M Shovel works in close quarters to dig and load limestone in the tunnel mine operated by the Columbia Quarry Company at Elsberry, Mo., about 62 miles north of the firm's headquarters city of St. Louis. Placed in service in November, 1949, the ¾-cu. yd. unit loads into rock trucks which have a ¼-mile haul out of the mine to the processing plant. Height of the ceiling in the mine ranges from 19 ft. to 22 ft., the headings are 45 ft. wide and the pillars measure 25 ft. by 45 ft.

Medusa's '49 Sales, Earnings Top All Records Since 1928

An all-time high in sales last year brought the greatest net income since 1928 to Medusa Portland Cement Company. President J. B. John predicted that the volume of business in the cement industry in 1950 will compare favorably with 1949. Net sales totaled $16,144,843 in 1949, a gain of $2,988,628, or almost 23 percent over 1948.

Net income jumped more than 57 percent during the year, to reach $1,714,215, or $9.69 a share; in 1948 income was $1,088,291, or $6.15 a share.

When representatives of 19 northern Illinois producers of limestone met recently to discuss the organization of a regional group, they decided unanimously to form the Northern Illinois Limestone Producers Association. The following officers were elected: L. S. Hackney, president; Russ Ruffner, vice-president; and William Seitz, secretary-treasurer.

Charles M. Upham Retires From Road Builders' Post

After 24 years as engineering director of the American Road Builders' Association, Charles M. Upham retired from these duties at the association's meeting in Cincinnati. His successor will be selected by a committee of the board of directors.

Mr. Upham, who will be 65 in March of 1951, will continue to serve on full salary as consultant for the next year, actively assisting in the forming of A.R.B.A. policies and program. Thereafter he will continue in this capacity for another five-year period.

Long identified with the highway industry, Mr. Upham was chief engineer for the highway commissions of Delaware and North Carolina. He was also director of the Highway Research Board. In 1946 he was given the Bartlett Award for outstanding contribution to highway progress.

Charles M. Upham

Residential Construction At New High Level During Winter Season

With 80,000 new nonfarm dwelling units started in February, the nation has just completed the most spectacular winter homebuilding season in its history. Builders have been starting new dwellings at the rate of about 80,000 units a month since last December, a volume we would not normally expect until the Spring. Still, this monthly volume represents a seasonal drop of 16 percent from the huge November figure of 95,500. Thus, the usual seasonal pattern has been maintained, but with activity at a very high level.

The unexpectedly large volume of housing so far this year reflects assurance about costs, which most experts agree will probably change little over the year. Added to this has been uneasiness about credit after expiration on March 1 of the emergency mortgage insuring provisions of the National Housing Act. Unusually favorable weather in many parts of the country has also contributed to the winter's larger volume. Housing demand continues virtually unabated, buoyed by high consumer income and the continuing high marriage and birth rates.

Accomplishment this year follows the homebuilding record achieved in 1949 when, as latest estimates show, 1,025,800 new units were started, nearly 10 percent above the previous peak of 937,000 in 1925. Even without the 36,000 public units started, 1949 surpassed all other years in housing activity. What is more, while attention was centered on the boom in apartments (41 percent above 1948) builders started the largest number of one-family houses in any single year in history. About 790,000 single-family homes were begun last year, up 3 percent from 1948, when the previous record was established.

Form Corporation to Develop And Finance New Concerns

According to an announcement issued recently by officials, the Cement and General Development Corporation was formed "to co-ordinate the development and financing of foreign and domestic industrial projects originated by its directors and to render advice and technical services to others who may be interested in industrial ventures". Headquarters of the concern are at 608 Fifth Avenue, New York 20, N. Y.

Directors include the following: Thomas W. Hill (vice-president and treasurer) director, Caribbean Cement Company, Ltd.; Guy Martin, attorney-at-law; Borge Hansen-Moller (vice-president); Charles S. Payson, director and member of executive committee, Armco Steel Corporation, and director, Enterprise Development Corporation; John B. Payson (vice-president); John A. R. Pepper, vice-president, World Commerce Corporation; Sir William Stephenson, director, World Commerce Corporation, and chairman, Caribbean Cement Company, Ltd.; and T. Reed Vreeland (president), director, Royal Typewriter Company, Inc., and Enterprise Development Corporation.

Speeders Kill Fewer but Maim More Americans in '49

According to figures released by The Travelers Insurance Companies, there were fewer automobile accident deaths on streets and highways of the nation last year than in 1948, but more injuries. Fatalities in 1949 totaled 31,800, as compared with 32,200 in 1948, the companies reported, but injuries last year soared to an all-time high of 1,564,000. The 1948 figure was 1,471,000 injured. These statistics are highlights of *Maim Street*, sixteenth in an annual series of traffic safety booklets issued by The Travelers.

Excessive speed headed the list of accident causes in 1949, as it has in most recent years. "Exceeding the speed limit" caused 10,100 deaths and 398,700 injuries in 1949, according to the booklet.

Union-Management Accord Ends National Gypsum Strike

The Clarence Center, N. Y., plant of the National Gypsum Co., resumed production on April 5 with the return to work on the middle shift of a portion of the 300 employees who went out on strike on March 24.

Settlement of the strike was announced after a labor-management meeting in the plant. This was preceded by conferences between the company and Local 247, United Gas, Coke & Chemical Workers, CIO, with Commissioner Clarence LaMotte of the U.S. Mediation and Conciliation Service.

Rockaway Quarry's New Plant Going Strong near Old Site

Horace S. Hills, president of Rockaway Quarry, Inc., San Francisco, Calif., has announced that although the quarrying and crushing operations of the firm were suspended at Rockaway Beach some months ago, the sand-and-gravel screening plant built one-half mile north of the original site is doing a good business.

The new operation was launched just before the company closed its crushing plant because of dust-nuisance complaints brought by residents of the area; it is fed with sand and gravel recovered from the ocean. Unfortunately, the announcement that Rockaway had ceased operating its crushing plant gave rise to the impression that the firm had gone out of business.

Construction of a $125,000 stone crushing plant in the Town of Lancaster, N. Y., is planned by the Lehigh Portland Cement Co. The plant will employ about 25 persons.

Alexite Perlite Assets Offered for Sale By Alexander Film Co.

The following announcement appeared in the April issue of *THE ALEXITER*, house organ of the AleXitE Division, Alexander Film Company, Colorado Springs, Colo., over the signature of J. Don Alexander, president:

"It is with regret that we announce to our friends that the Alexander Film Co. is going out of the perlite business and is offering for sale the perlite assets of the AleXitE Engineering Division.

"At the recent convention in Chicago, I resigned from the vice-presidency and board of directors of the Perlite Institute, and Harold Mulnix resigned from the chairmanship of the institute's publicity committee . . .

"A suitable building on the trackage of two railroads in Florence, Colo., has been purchased and machinery ordered to process furnace-ready ore at the rate of about 50 t.p.h. Also a new modern type expander will turn out PerAleX aggregate."

It was indicated that the division will continue to fill orders until a successor takes over the operation. Officials of the company will concentrate all their energies upon the original business of the Alexander Film Company, which has recently increased to the point of overtaxing existing facilities.

Kentucky C.S.A. Attracts 200 at 7th Annual Meeting

More than 200 members and guests attended the seventh annual banquet of the Kentucky Crushed Stone Association at its meeting in Louisville on March 25. A program dealing with various phases of agricultural limestone and highway construction included addresses by A. T. Goldbeck, engineering director, National Crushed Stone Association; H. A. Huschke, managing director of the Agricultural Limestone Institute; and several representatives of the Kentucky Department of Highways.

The annual election resulted as follows: president, J. F. Pace, Marrowbone, Ky.; and Martin T. Smith, Frankfort, vice-president.

● Correction

The statement in an item which appeared in our March issue indicating that the Huron Portland Cement Company is considering the addition of a new cement carrier to its present fleet proves to be erroneous. According to P. H. Townsend, vice-president and general manager of the firm, the building of a new steamer is not a part of the company's expansion plan.

Mr. Townsend states that certain improvements are being made in the three carriers now transporting cement for Huron—the *S. T. Crapo*, the *John W. Boardman*, and the *Samuel Mitchell*. We regret the error, and are grateful to Mr. Townsend for the correction.

Death Claims H. E. Millard, Prominent Industrialist, After Illness of Six Weeks

Harry E. Millard, prominent and widely-known quarryman, sportsman, cattle raiser and industrialist, died on March 17 at his residence, Millarden, just west of Annville, Pa. Death resulted from a stroke he suffered about six weeks previously at his winter residence at Cocoa, Fla., where he had spent his winters for some years. He was taken to his Annville home and passed away there four days later.

Mr. Millard was known in the stone and lime business and manufacturing industry throughout the East. He was president of the H. E. Millard Lime & Stone Company.

His father, the late J. B. Millard, himself a widely known quarryman banker and philanthropist, started the Millard quarry interests with a small operation in North Lebanon, Pa., in 1880, immediately after moving his family to that city. The Annville operation, now the main plant of an extensive enterprise, was started in 1900, when Mr. Millard joined his father in the quarry business. He ultimately succeeded his father after the latter's retirement and subsequent death and personally took over the management of the enterprise. Under his direction the firm expanded and new quarries were opened in the Myerstown and Millardsville sector. These were operated for several years.

Harry E. Millard

In 1929 the Millard stone quarry and lime business were further expanded with the acquisition of the Walter T. Bradley operations west of Palmyra and the Swatara quarry just west of Hershey. With the addition of these properties, the Millard quarry business became one of the largest industries of that type in the country.

In 1936 the main Annville operation was enlarged with the erection of the first of three rotary kilns. Two more were erected in 1937 and 1939, until today they represent what is said to be the largest operation of this particular type in the nation. The quarry enterprise and farm operations, known as the Millarden Farms, now furnish employment for more than 400 employees, and the extensive farm holdings extend virtually from Annville to Palmyra along Route 422, which bisects the farm lands.

Harry E. Millard also took a keen and active interest in outdoor sports such as fishing and hunting. In more recent years he became an aviation enthusiast, and that interest prompted him to establish the Millard airport just west of Annville and maintain a fleet of passenger planes there. His interests also included an association with a banking business as a director of the Annville National Bank.

Wisconsin Quarry Operators Find Many Uses for Tractor

In stride with the continually progressive soil preservation program fostered by Wisconsin, an eleven-acre limestone quarry, five miles north of Janesville, has recently been placed in operation by Frank Brothers, Milton Junction, Wis., contractors. With production at a peak during the months of March, April, and May, the daily average amounts to approximately 350 tons, with 20 percent of the product passing 100-mesh and 72 percent passing 8-mesh screen. Chips are used for sub-basing and feeding-floors for hogs.

Overburden is stripped to a depth of from 4 to 18 ft., using an Allis-Chalmers HD-14 tractor. The exposed limestone is blasted with dynamite and the large chunks are further broken with a heavy piece of drop iron.

Grading and cleaning of the quarry floor is accomplished with an Allis-Chalmers Model D motor grader equipped with a Tractomotive loader. It is also used for backfill and related cleanup work, loading operations, and snow removal. The latter is an important seasonal function of this unit. (See illustration.) With operations carried on to a considerable extent during the late winter and early spring months, it has proved almost indispensable in removing snow, clearing the quarry floor, and in haul-route maintenance.

The Frank Brothers operate a fleet of trucks in which they deliver the soil sweetening lime to farmers within their market radius. Since the services which they provide also include spreading, delivery units are equipped for this purpose. The firm also engages in gravel crushing operations, general excavation, and sewerage work.

• A motor grader equipped with a tractor loader grades and cleans up at the Frank Brothers operation after a blizzard.

Iran Launches First Unit Of Development Plan with $6,000,000 Cement Mill

Spearheaded by the construction of a $6,000,000 cement plant at Shiraz, Iran, is the Seven-Year Development Plan of the Iranian Imperial Government, which involves four other similar projects in the country's plan for improved cement production.

Each will be a plant-city community centered about the cement mill, with model housing, hospitals, sewage, light-and-power facilities, and educational programs.

This announcement was made by Byron H. Pyle, vice-president and Maurice Shafer, assistant to the president, Kennedy-Van Saun Manufacturing and Engineering Corporation of New York. The first equipment units for the new 200-ton capacity cement plant at Shiraz were shipped by Kennedy-Van Saun on April 6. According to these executives, engineering details will for the first time carry complete "quality controlled" American engineering standards into the Middle East industrial area.

More than $250,000 will be spent for machine shop tools and equipment, since the community at Shiraz will be completely equipped for handling all repairs and maintenance. In addition more than $500,000 will be expended on structural work.

Up to the present time the only cement plant in Iran is the one at Teheran, which began producing cement in 1926.

When completed, the new plant will produce 60,000 tons per year, at a cost estimated at about 15 percent below the cost of imported cement. It will more than double Iran's cement output, but will not obviate the importation of cement at the outset. The other four plants will be built at Isfahan, Meshed, Tabriz, and Dizful. In addition, the production schedule at Teheran will be doubled.

N.S.G.A. to Make Own Awards In 1950 Safety Competition

As has been previously announced in PIT AND QUARRY, the National Sand and Gravel Association and the United States Bureau of Mines have worked out an arrangement whereby at the close of each calendar year beginning in 1950 the Bureau will make a separate report to the association on the sand-and-gravel safety contest covering the records of participating member companies. Awards will go to companies making the best showings. The Bureau will continue to allow all sand-and-gravel firms, irrespective of association membership, to participate in the safety contest; but the N.S.G.A. awards will be based upon a membership contest.

Previously N.S.G.A. and the National Ready Mixed Concrete Association had only two contest awards, one for the firms working 100,000 man-hours or less during the calendar year, the other for those working more than 100,000 man-hours. Beginning with this year trophies will be awarded to *member companies* in the following three groups: (a) companies with plants working 50,000 man-hours or less in the calendar year; (b) those with man-hours ranging from 50,001 to 100,000, inclusive; (c) and those with more than 100,000 man-hours. The safety record of *each* plant will be considered separately.

• Get set for the May 15-July 4 Savings Bond Drive.

The Bureau of Mines sends to each member of the sand-and-gravel industry a copy of the contest rules. The Bureau will not use the man-hour rule, but will confer its own awards based on division of participating plants into two groups: A— bank or pit operations and B— dredge operations. The Bureau will award certificates of achievement in safety to each plant operating throughout the year without a lost-time injury.

According to Vincent Ahearn, executive secretary, the N.S.G.A. safety committee decided to confer a certificate on each member company which has a no-lost-time-injury record, but which failed to win a trophy because the plant of another member reported more man-hours. It is also planned to award N.S.G.A. certificates to all employees of sand-and-gravel plants having no-lost-time-injury records, including those which win the three trophies. (The certificates will be in addition to the Bureau of Mines certificates mentioned above.)

Universal Atlas, Louisville Win Bull Shoals Contracts

Contracts for cement for the Bull Shoals dam in Arkansas have been announced for the Universal Atlas Cement Company and the Louisville Cement Company. Universal Atlas was awarded a contract to supply 726,000 bbls. of portland cement. According to Lt. Col. Otto J. Rhode, acting engineer of the Little Rock District, Corps of Engineers, the bid on six lots totaled $2,486,550.

The Louisville company won a contract to supply 242 bbls. of natural cement, the low bid being $771,980.

According to C. E. Heinrichs, vice-president of the Virginia Carolina Chemical Company at Richmond, the firm is making radical changes in pumping, to be followed by 1950 deliveries of the two 17-cu. yd. electric draglines.

Outline Coming Attractions For N.I.S.A. Meeting At Hot Springs, May 17-19

A preview of the coming National Industrial Sand Association annual meeting, scheduled for May 17-19, has been released by Vincent P. Ahearn, N.I.S.A. executive secretary.

On the opening day there will be open discussions on packaging ground sand and on general questions relating to foundry sand, led by Stanton Walker, consulting engineer. Emery M. Durstine, chairman of the traffic committee, will report on the work of his group. Commerce Counsel Collin will tell of the outcome of the association's public hearing in connection with its bonded sand complaint in Washington.

A report on recent developments in workmen's compensation insurance legislation affecting the industrial sand industry will be given on the following day by Counsel Waters, who will also discuss negotiations of the N.I.S.A. with the National Council on Compensation Insurance regarding silicosis rates.

At the same session Fred W. Braun, vice-president and chief engineer, Employers Mutual Liability Insurance Company of Wisconsin, will address the meeting on occupational disease problems.

Friday's featured speaker will be George C. Smith, economist, United States Chamber of Commerce, who will discuss *Business and the Welfare State*. Later on that day there will be a discussion of the results of the Association's test run in New Jersey on exchange of information with respect to delinquent accounts. This will be followed by a general discussion of current industry problems and by Mr. Ahearn's report on the Washington scene.

Entertainment will be highlighted by evening bingo parties with Emery Durstine serving as master of ceremonies. There will be a tea for the ladies and golf tournaments for men and women.

Smidth Kiln Athens-Bound For Use in Rehabilitation Work

The cargo vessel *Robin Trent* sailed on March 20 from New York, bound for Piraeus, Greece, with a 400-ton F. L. Smidth rotary cement kiln consigned to the Geneva Cement Company of Athens. The kiln was shipped knocked down in ten cylindrical sections, which average 40 ft. in length and 13 ft. in diameter.

This equipment is to be used in the rehabilitation program for the Athens area, its cost underwritten by the Economic Cooperation Administration.

A final liquidating dividend of 34.4 cents per share was recently declared by the Yosemite Portland Cement Company to holders of preferred stock. The firm has been in liquidation since the sale of its principal properties to the Henry J. Kaiser Company in 1944.

Pipeboom Tractor Slashes Texas Firm's Quarry Costs

A REVOLUTIONARY new method of handling mill blocks in a quarry, which saves thousands of dollars in equipment and operating costs, has been demonstrated by Joseph J. Kell of Leuders, Tex., owner of West Texas Stone Company. Mr. Kell states that firm's expenses were cut drastically by using an International TD-14 diesel crawler tractor, equipped with a Superior sideboom, to move block.

This unique application of a pipeliners' "boom tractor" made it possible for West Texas Stone to eliminate stationary hoists and derricks in its quarry. The tractor picks up limestone cut from the shelf and "walks" the blocks across the excavation, depositing them on stockpiles or waiting trucks.

After buying the TD-14, which he says paid for itself in three months, Mr. Kell sold approximately $20,000 worth of stationary equipment which he no longer needed. His 25-man working force was reduced to four men, since it was not necessary to have crews to operate and maintain hoists and derricks.

Production at the quarry rose 80 percent. Formerly 25 men operating six hoists and six derricks produced not more than 10 blocks a day. Now four men and the TD-14 average 18 blocks daily, and have turned out as many as 25. Blocks average 3 ft. 6 in. by 7 ft. 6 in. by 20 in. in size, and 5,500 lbs. in weight.

The TD-14 is used only two hours a day, and in that time it moves enough stone to keep ahead of the requirements of the company's plant, which produces building block. Even greater savings could be achieved, Mr. Kell points out if the crawler were used eight hours a day. This has not been done because it would require four four-man crews in the quarry to keep the tractor busy, and an enlarged plant to absorb the increased output of mill block.

Mr. Kell bought the tractor within 24 hours after seeing a magazine illustration showing one which was equipped with a pipeboom. The tractor-sideboom unit impressed him as an ideal device for handling stone in a quarry, a machine that could be moved from quarry to quarry at slight cost and that could "walk" the blocks about and put them wherever desired. He believes that a larger diesel crawler, such as the International TD-18A, could take care of moving stone in any quarry.

Officials of the Lone Star Cement Corporation have announced that the firm's executive offices and Metropolitan Sales Division are now located at 100 Park Avenue, New York 17, N.Y.

• Workers in the West Texas Stone Co. quarry cut a limestone block 3½ ft. by 9 ft. by 20 in. Holes are made with an air drill, and the stone is split by wedges.

• Operator Frank Reves lifts the block with the TD-14. This piece of limestone, larger than average, weighed 6,500 lbs.

• The TD-14 makes a quick, easy job of loading trucks. Two men swing the suspended stone into position as Mr. Reves prepares to lower it to the truck body.

• The TD-9 and a scraper are used to strip overburden averaging 10 ft. in depth from the limestone.

Italian Cement Makers Inspect Operations Of Two Alpena Plants

Three executive of ItalCementi of Bergamo, Italy, recently visited Alpena, Mich., to inspect the quarrying and cement-making operations of Wyandotte Chemicals Corp. and the Huron Portland Cement Co., as well as the equipment with which those jobs are done. Shepherding the group was Robert E. Young, a special sales and engineering representative of Harnischfeger Corporation, whose Milwaukee heavy equipment plant the Italians have inspected.

ItalCementi operates 32 plants in Italy, and the three executives are in this country to inspect American methods and equipment, intending eventually to purchase machinery under provisions of ECA and the Marshall Plan to modernize their plants.

They are Paolo Radici, general technical manager of the concerns; and Antonio Benigno, and Enrico Briolini, technical advisors. Also in the party are Bario Sobrino, Italian representative for Harnischfeger Corp., and Filippo Theodoli, who serves as interpreter.

Best's Safety Directory For 1950-51 Now Available

The new *Best's Safety Directory* for 1950-1951, covering the entire field of safety, fire protection and control, hygiene, first-aid and sanitation, is now available, according to an announcement of Alfred M. Best Company's Safety Engineering Division.

The Directory is unique in that it combines all the best practical features of a safety manual, directory, index, encyclopedia and catalog in one comprehensive, profusely illustrated, 511-page volume.

The book is priced at $5, with lower rates for quantities. It may be obtained from the home office of the Alfred M. Best Company, 75 Fulton Street, New York 7, or branch offices in Atlanta, Boston, Chattanooga, Chicago, Cincinnati, Dallas and Los Angeles.

L.I.M.E. Assets Acquired By Knowles Associates

Knowles Associates of 19 Rector Street, New York, have acquired the files, drawings, designs and operating data of L.I.M.E., the consulting and designing business of the late W. R. Cliffe.

This arrangement will continue the availability of the Cliffe designs and experience to the many followers of Mr. Cliffe. It will also augment Knowles Associates' experience in the lime field, to which they have already contributed much.

Business Is Looking Up— Warner Co. Report Proves It

The Warner Company's 1949 report to stockholders showed an interesting comparison between 1948 and 1949 "facts in brief". According to the following condensed figures, the state of the firm showed marked improvement in the year just past:

For 1949: net sales and other income, $18,047,260; net income before taxes, $4,422,804; net income after taxes per common share, $5.55; dividends per common share, $1.65.

For 1948: net sales and other income, $16,982,586; net income before taxes, $3,787,268; net income after taxes per common share, $4.79; dividends per common share, $1.25.

The Ideal Cement Company is spending $200,000 on a dust-collection project at its plant near Fort Collins, Colo., Cris Dobbins, executive vice-president and general manager recently announced. The precipitator on the plant's main stack is being reconditioned and additional dust collecting equipment is being installed on other plant units.

Newly-Opened Halliburton Cement Plant's Full-Scale Output 4,000 Bbls. Daily

At Corpus Christi, Tex., the $10,000,000 Halliburton Portland Cement Company's plant began distributing its product early in March by shipping its first 21,000 bbls. of cement. Full-scale production was scheduled for early April. It is estimated that the plant will soon be turning out 4,000 bbls. of cement daily.

The plant is located on a 40-acre tract on Navigation Boulevard. Launched by Erle P. Halliburton Sr., the enterprise is housed in a remodeled aluminum ore processing plant purchased in St. Louis and moved to Corpus Christi. Officers of the company include the following: Erle P. Halliburton Jr., vice-president; Elroy King, vice-president and secretary-treasurer; A. J. Anderson, plant manager; Everett E. Knott, sales manager; and Roy Beaver, assistant secretary-treasurer.

Modern Truck Fleet Speeds Construction in Puerto Rico

What started as an infant cement industry in Puerto Rico less than ten years ago has developed into Cemento Ponce, the second largest factory of its kind in Central and South America and one of the top 15 cement plants in the Western Hemisphere.

Ponce Cement Corporation was organized in 1941 to quarry native raw materials for the manufacture of cement for local construction. Antonio Ferré started the company with one kiln, producing 4,000 bags of cement each working day. From the start Antonio Ferré planned economical distribution of the product by truck, direct from factory to customer without transfer of load.

Wartime construction of air and naval bases, fortifications, and defense projects kept production constantly on the rise during the war, but it wasn't just a war boom plant. Starting in January, 1950, Ponce Cement Corp. will raise its daily capacity to nearly 30,000 bags of cement per day from four kilns. The Ponce plant maintains a high volume of production for continuing construction throughout the island, as well as for substantial exports to other Caribbean countries.

Today a fleet of 20 White trucks, equipped with 5-cu. yd. dump bodies, operate between the extensive quarry areas and the plant, transporting 1,200 tons of raw materials daily. The company's fleet of 35 White tractor-trailer units, each able to haul 500 bags of cement, keep the product moving to all parts of the island and to two company ships used for export business.

• A part of the fleet of 35 tractor trailer units deliver Cemento Ponce products throughout Puerto Rico.

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

PROBABLY the feature of the May, 1920, issue of PIT AND QUARRY was the reproduction in full of a letter by John Rice Sr., president of the National Crushed Stone Association and of the General Crushed Stone Company, to the Interstate Commerce Commission. In this letter Mr. Rice ably presented the case of the mineral aggregates industries in asking for freight rates comparable to those on other commodities.

Daniel J. Hauer, associate editor, was the author of two original articles—on *Some Principles of Selecting Quarry Machinery* and *Quarry Records*, both pertinent problems confronting many producers. There was also a complete description of the *Uniform Cost Sheet* being developed by the National Crushed Stone Assn. with the aid of its members.

Several articles in this issue described the rapid swing toward delivery trucks by producers in different sections of the country. In San Francisco producers began to replace horse-drawn vehicles with trucks in 1916 and by 1920 over 95 percent of such hauling was being done by trucks. In Louisville, Ky., trucks were also being adopted at a rapid rate and were solving the freight car shortage problem. In Buffalo, N. Y., trucks were softening the impact of a railroad switchmen's strike which had rail freight shipments at a standstill. In Indianapolis, Ind., one of the largest gravel producers credited trucks with making possible all-winter operation of his plant.

The feature plant story in this issue described the large new plant of the Washington Sand and Gravel Company, Bladensburg, Md., which produced seven sizes of material. The river deposit was worked by a hydraulic dredge feeding to a large sump at the plant from which silt overflowed back into the river. A digging elevator fed the material to the crusher, and another elevator fed it to the five pairs of Stephens-Adamson conical screens over the bins.

The manager of the Sheboygan Lime Works, Sheboygan, Wis., Miss Elfrieda H. Roth, was featured in another article. Henry E. Roth, had founded the company in 1854 and after his death his widow and later his daughter had carried on the business.

A news item told of the reincorporation and recapitalization of the United States Gypsum Company under the laws of Illinois. Capital stock, according to President Sewell L. Avery, was to be increased from $10,000,000 to $18,000,000.

Ray Cook Sr. Named to Head Iowa A.L.A. at Des Moines

The fifth annual meeting of the Iowa Agricultural Limestone Association, Inc., was held on March 8 and 9 at Des Moines, with a record-breaking attendance of 249. An address on conservation by Governor Beardsley highlighted the program, which also included other excellent speakers. A reception and a buffet dinner, followed by an entertaining talk and dancing, completed the social schedule.

Ray Cook Sr. (Ray Cook Construction Company) was elected president, and C. M. Kirtley (Missouri Valley Limestone Company) became the new vice-president. Clint A. Allen is the association's executive secretary.

Lehigh To Spend $150,000 Improving Buffalo, N. Y., Mill

The Lehigh Portland Cement Co. is spending approximately $150,000 for new facilities at its Buffalo, N. Y., plant. Approximately $100,000 of this outlay will be for construction of new-type cement loading bins, which will be constructed of steel and concrete. The remainder will be spent for the erection of a concrete-block-and-brick garage.

One of the largest cement plants in Lehigh's chain of 14, the Buffalo mill produces about 2,500,000 bbls. of cement a year. Like numerous other cement plants, the Buffalo mill has been operating at full capacity for several years. Temporarily two of its four kilns are out of service for repairs.

Wyandotte Dolomite, Inc., a new corporation at Findlay, O., has opened a quarry near Carey, O., and plans to erect a crushing, screening, and drying plant. Shipping facilities will be available via the New York Central Railroad.

From the State Capitals

CALIFORNIA—California's Senate passed and sent to the House for concurrence a resolution asking the State Department of Public Works to investigate the feasibility of constructing a high-speed toll road along the west side of the San Joaquin Valley between Los Angeles and San Francisco.

COLORADO—Colorado's Supreme Court has handed down an opinion clearing the way for construction of a Denver-Boulder toll road.

Reversing a lower court judgment, the 5- to -2 opinion by the State Supreme Court held that the joint legislative resolution authorizing the turnpike constituted "legally and validly expressed approval of the project", and that the measure committing the state to underwrite 30 percent of the cost does not create a general obligation debt and therefore does not violate the state constitution.

The Denver-Boulder toll road is expected to cost approximately $5,600,000. The state is obligated to pay up to 30 percent of the cost if revenues from the road itself prove insufficient.

KENTUCKY—A bill authorizing establishment of a toll road system in Kentucky under the direction of the State Highway Department was given final passage by the Kentucky Legislature.

The measure authorizes but does not require the State Highway Commission to construct toll superhighways.

MISSOURI—Missouri's electorate overwhelmingly defeated in a statewide referendum a proposed increase in the state gasoline tax rate from 2 to 4 cents per gallon, to raise an estimated $16,000,000 in additional annual revenue for highway modernization.

MISSISSIPPI—An enabling bill for the construction of a $6,500,000 concrete toll bridge on U. S. Highway 90 across the Bay St. Louis was passed by the Mississippi Senate and sent to the House.

Passed by the Senate and sent to the House was a bill increasing beer taxes from 2 to 4 cents a bottle, to produce $4,320,000 as partial replacement for general funds used for rural roads.

Returned to the House for concurrence in Senate amendments was a bill diverting to rural roads $3,600,000 received from gas and automobile sales taxes.

NEBRASKA—A reduction of $9,000,000 or 60 percent in Nebraska's highway improvement program will result if Governor Peterson's highway program is voted down at a November election referendum, according to recent estimates.

Repeal of increases in the state gasoline tax and motor vehicle license fees would cause a loss of more than $4,500,000 a year in state highway funds. Nebraska would also lose the chance to get a matching $4,500,000 annual in federal aid funds, the governor warned.

NEW JERSEY—Plans for a greatly expanded schedule of construction awards during the second quarter of the year were revealed by commissioners of the New Jersey Turnpike Authority. In the first quarter the authority had awarded 14 contracts totaling $25,862,140.

NEW YORK—Final approval was given by the New York State Legislature to a 10-year program for town highways.

The legislation contemplates the expenditure of $146,400,000 for town roads, with the state providing half the cost over a 10-year period. It carries no appropriation for this year, but authorizes the 929 towns of the state to proceed with the preparation of plans for submission to the State Public Works Department.

Governor Thomas E. Dewey has signed into New York State law an administration measure providing for the financing of the projected $450,000,000 New York-to-Buffalo "throughway" superhighway by a variation of the toll system.

WASHINGTON NEWS LETTER

By S. HERBERT UNTERBERGER

Tax Surprise

A PRELIMINARY report released recently on the tax returns made by individuals and businesses on or before March 15 gave Washington a severe jolt.

This report indicates that tax receipts for the coming year may be as much as 15 percent below last year. Many government officials expected some falling off of tax receipts but practically none of them expected the drop to be so sharp.

As a matter of fact, until very recently, there were some in Washington who were confidentially stating that our budget difficulties were being magnified; that the deficit, if any, would be very small. Their voices are conspiculously silent now.

They may have fallen into this error by limiting their reading to the financial statements of a few exceptionally prosperous corporations and industries. It is true that in 1949 General Motors established an earning record never before achieved by any other company, and that U. S. Steel, despite the strike, made more money than in the previous year. The construction industry also generally had a good year.

But as is now evident these were not typical of business in general. The profits of most companies, large and small, appear to have dropped and a few are showing losses. This is true even of some companies in the very profitable auto and steel industries. Elsewhere the situation was even worse. The long drawn-out, off-and-on coal strike wrought havoc with coal company profits, while the cut-back in inventories produced the same effect on textile profits. Price declines accounted for much of the drop in the profits of other industries, while the virtual elimination of the war-induced pent-up demand reduced both volume and profits in retail trade.

This decline in business profits is the principal cause for the fall in tax receipts. By way of contrast, the incomes of individuals fell off very little, if at all.

The net result is a heap of budget trouble for the government. For the rest of this fiscal year, which ends on June 30, 1950, the government is commited to very heavy expenditures. With its income down and its expenditures up, it will probably end the year $6,500,000,000 in the red.

On the basis of the March, 1950, returns, it is possible to make a fairly close estimate of the income for the next fiscal year. The experts now think it will be around $37,000,000,000. It will be remembered that President Truman's budget for the next fiscal year called for expenditures in excess of $42,000,000,000.

From present indications, however, it appears that the expenditures will be greater than that. This is based on three premises: (1) for some years now, despite loud protests of individual members of the Congress, the total appropriations finally voted have exceeded the budget requested by the President; (2) this is an election year and congressmen are disinclined to vote against any appropriations, particularly those affecting their home districts; (3) there is pressure which appears to be irresistible for increasing the military budget above the very modest request of the defense establishment. It will be no surprise, therefore, if the 1951 deficit turns out to be at least as large as that of 1950.

Tax Outlook

Despite this depressing budget outlook, some tax relief, particularly among excise taxes, appears likely soon. On the other hand, new taxes are exceedingly improbable. Even attempts to "plug up loop-holes" are not likely to get very far.

One proposal which seems to have a chance of passage is a tax speedup for corporation taxes. At present, corporations, like individuals, may pay their taxes in four installments. The suggestion is to reduce this to two installments, a procedure which would not yield any more revenue but would increase income in the fiscal year 1951 and thereby reduce the deficit for that year. The hope is that the budget would be in better condition the following year. Of course, this is really only postponing the inevitable—a kind of self-delusion to which government officials are frequently susceptible.

Another suggestion which has more of the aspects of "loop-hole plugging," is a pay-as-you-go system for collecting taxes on dividends. The government has discovered that it collects taxes on only about three-fourths of the dividends declared. One way of preventing evasion would be for the government to require that a certain amount be withheld from the dividend before it is paid, similar to the withholding of taxes from a worker's pay.

Demand for Residential Housing

The U. S. Department of Commerce has recently completed a special study on the demand for residential housing which should be of interest to businessmen engaged in construction and related industries. The demand for housing, according to the Commerce Department, depends in great part on the number of new families or households formed. In that connection, the Department comes to the following conclusion: ". . . following the restrictions of the war years, the net increase in dwelling units over the last three years has been two to three times that necessary to take care of the normal three-year growth in households. Since the rate of improvements so existing structures has also been high, this has meant that considerable progress has been made in alleviating the acute need which was a legacy of the war. It appears that the larger part of the demand pent up during the war—somewhere around two-thirds of the backlog existing at the end of 1945—has now been met, though this must be subject to the qualification that some of the units provided represent temporary solutions of the problem.

"The remaining backlog is still large and appears sufficient to warrant construction close to the recent yearly rates for a considerable period, although probably not extending beyond three years. (This appraisal assumes favorable business conditions in this period.) Nevertheless, it is not too early to consider the implications of the elimination of war-induced shortages and the challenging requirement of broadening the market base. The latter involves the opportunities which would flow from the development of a large replacement market to improve the available housing. Activation of a large replacement demand . . . seems to offer the best hope of sustaining activity beyond the volume necessary merely to take care of the normal increase in households."

• A general view of the Edward C. Levy Company's new slag processing plant at Detroit, Mich. Buildings from left to right house respectively the screens and bins, the primary crusher, and the three secondary crushers.

Levy Slag Processing Plant Crushes, Screens at Rate of 500 T.P.H.

By W. M. AVERY

• Edward C. Levy, founder of the Levy company.

another ON THE SPOT picture

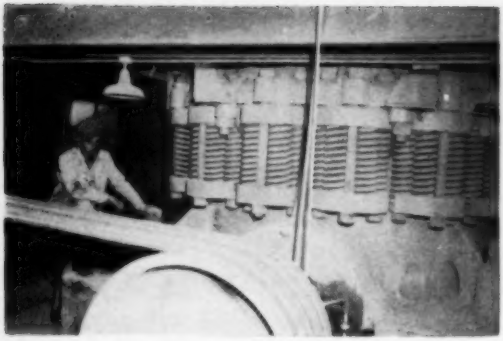
A LITTLE over a year ago, after more than a quarter of a century of extensive operations in purchasing, hauling, and selling blast furnace slag, the Edward C. Levy Company of Detroit, Mich., completed construction of its first plant for crushing and screening the material. The new plant, which was opened early in January, 1949, is not only one of the finest in the industry, but very probably one of the largest. Designed to produce crushed and screened slag at the rate of 500 t.p.h., it has to date frequently overshot this rate by as much as 20 percent. During a single day in January of this year 5,076 tons of slag was crushed to set a record for daily output.

The Levy crushing and screening plant is located about three miles from the huge 1300-acre River Rouge plant of the Ford Motor Company. Molten slag from the Ford blast furnaces is dumped from ladle cars into two open pits which measure 20 ft. in width by 15 ft. in depth by 750 ft. in length. After the slag cools, it is dug from the pits and loaded into trucks with two 605 Koehring draglines mounting special 2-cu. yd. Page buckets. This service is so brutally punishing that it is necessary to replace bucket teeth every day or two. Operations at the slag pits are normally on the basis of a 50-hr. week.

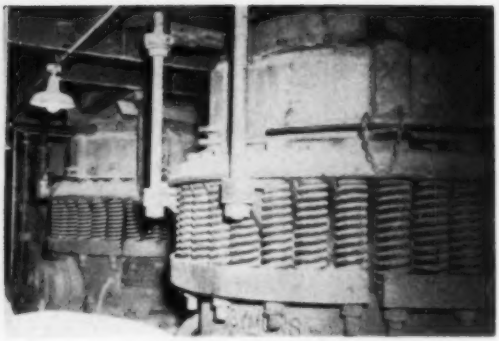
Most of the slag is hauled to the plant in Fruehauf side-dump trailers drawn by International tractors. By hooking two of the trailer units together, 36 tons can be handled in each trip. At the plant the material is dumped into an underground hop-

• This view shows one of the tractor-drawn trailers discharging raw slag into the feed hopper. The D-8 bulldozer in the background is also feeding the same hopper. The electromagnet is used for removing skulls and other large metal fragments from the flow.

• Homer Brown, superintendent of the slag plant, and Morton Harris, who is in charge of all the company's operations.



• Plant superintendent Homer Brown beside the 7-ft. standard cone crusher used for primary breaking.



• A view of the two 4-ft. standard cones used for secondary crushing. There is also a 4-ft. short head for fines.

per, or stockpiled at ground level for later feeding by means of a D-8 Caterpillar bulldozer. Skulls and other large magnetic pieces are removed from the flow with a Cutler-Hammer electromagnet suspended from the boom of a 501 Koehring crawler crane. Small metal particles are removed elsewhere in the flow with Stearns magnetic pulleys.

In the hopper the material passes over a grizzly into a Cedarapids reciprocating feeder which places it at a constant rate onto a short 48-in. belt conveyor. The latter in turn discharges below grade onto an inclined 36-in. belt which feeds the primary crusher.

The raw slag passes over a Kennedy-Van Saun scalping screen and then drops into a 7-ft. Symons standard cone crusher, the fines rejoining the flow at a point below the crusher. A second 36-in. inclined belt carries the material to the separately-housed secondary crushers, these consisting of two 4-ft. Symons standard cone crushers, and one 4-ft. Symons short head cone crusher for very fine material. There is also a Kennedy-Van Saun scalping screen in the secondary crushing circuit.

The product of the three secondary crushers is conveyed some 300 ft. to the top of the screen house, where final sizing is done with six 5- by 12-ft. double-deck vibrating screens. Five of these units were supplied by Kennedy-Van Saun, and the sixth by Allis-Chalmers. With this abundant screening capacity it is possible to screen simultaneously virtually all sizes of material from ⅛-in. to 4-in.

• The 36-in. belt conveyor which receives material from the secondary crushers and discharges it at the top of the screen house.

Four 24-in. belt conveyors connect the various screens in this circuit, and there is also an oversize gravity return pipe which discharges onto

• One of the six 5- by 12-ft. double-deck vibrating screens on which final sizing is done. These screens are located over the storage bins.

• Adjacent to the slag plant is this 10- by 60-ft. 500-ton capacity platform scale.

the No. 1 conveyor feeding the primary crusher. From this it will be apparent that the flow diagram, after passing through the primary and secondary crushing buildings, doubles back at a relatively sharp angle to the screen house, which is only some 60 ft. distant from the main feed hopper.

Below the sizing screens, the highest of which is located about 55 ft. above grade, are the bins in which the various sizes of finished product are stored. There are five compartments, with a total capacity of close to 5000 tons. Blending is done on a 24-in. belt conveyor which is loaded from the bin gates by means of a short feeder conveyor. The blending conveyor, which is on the center line of the bins, inclines upward after it clears the structure and discharges into an elevated hopper from which either railroad cars or trucks can be loaded. There are two roadways under the bins for direct loading of trucks.

The Levy plant has one of the finest conveyor systems we have seen in a slag plant. All have convenient walkways and all are completely housed with corrugated sheet iron. They are carried on well-braced steel trusses; and intermediate supports, where required, consist of slender reinforced-concrete bents. The longest single run, from the secondary crushing building to the screen house, measures about 340 ft. from head pulley to tail pulley. The conveyors, all of which travel at 400 f.p.m., were furnished by Robins.

Drives throughout the plant are interlocked electrically, so that when trouble develops at any point in the system all affected units are cut off automatically. The interlocking system also controls starting and stopping sequences. All primary controls are mounted on and operated from a central panel located in a separate building. The plant uses primary 4400-volt current supplied by the Edison Co. This is stepped down to 440-volt current with three 200-kv.-a. transformers.

● Small metal particles are removed ahead of the secondary crushers by means of a magnetic head pulley at the top of the feed conveyor.

Ed Levy, founder of the company which bears his name, began purchasing and hauling slag from the old Ford steel plant more than 25 years ago. Throughout most of this period Ford operated its own crushing and screening plant. Ford's facilities were inadequate for handling the additional volume of slag produced by a recently completed 1500-ton blast furnace, and the company decided to abandon its slag processing operations altogether. This decision led to the design and construction of the Levy plant.

While the new plant was under construction, it was imperative to do something about the raw slag that accumulated in the pits each day. Since stockpiling would inevitably involve a great deal of costly rehandling, a Cedarapids portable crushing plant was purchased and operated for a period of seven months while the fixed plant was being completed. During this period some 280,000 tons of slag was processed.

For the last 15 years Levy has also handled slag for the Great Lakes steel plant at Ecorse, Mich. This material, however, is crushed and screened by Great Lakes. Levy held the contract for hauling some 4,000,000 cu. yds. of fill material into the swamp on which this 200-acre plant now stands.

At Trenton, Mich., the Levy company screens minus ¾-in. limestone for the Solvay Process Division of Allied Chemical & Dye Corporation. In this operation road stone, ¼-in. chips for block plants, screenings for asphalt plants, and agricultural limestone are produced.

In all its varied operations the company employs more than 200 pieces of mobile equipment, including 18 shovels and 13 bulldozers. All repair and maintenance work on this equipment is done in a large and unusually well equipped shop located on the slag plant property. Weekly consumption of gas for the truck fleet and other units runs close to 10,000 gallons, and an additional 2,000 gallons of diesel fuel is consumed weekly. The company's haulage operations in slag, coal,and limestone alone amount to about 2,000,000 tons per year.

Levy builds and maintains all roads and parking areas in the 1300-acre Rouge plant, using Ford slag exclusively. The company also handles all the flux stone used in the Ford steel plant, hauling this material from the docks to the open hearth furnaces.

During the peak season of operations the Levy company employs close to 300 people. The new slag plant, however, produces at full capacity with a crew of only nine men, making it one of the most efficient operations of its kind in the country. Ed Levy is president of the company, and his nephew, Morton Harris, is in charge of operations. Homer Brown is superintendent of the slag plant, and Frank Churchill is superintendent of yards and maintenance.

$140,000 Plant to Be Opened At Knoxville by Shalite Corp.

Manufacture of a lightweight aggregate for concrete construction is planned at Knoxville, Tenn., by the newly organized Shalite Corporation, formed by local interests. The aggregate will be made of local shales which, by a sintering process, are fused and expanded into a highly porous relatively light material. The product, to be marketed under the name of Shalite, will be manufactured in a new $140,000 plant to be built on the corporation's 30-acre property two miles from the city limits. Capacity of this initial unit will be 260 tons of aggregate daily. Operations are expected to start by late Spring.

President of Shalite Corp. is Ben A. Batson, former TVA industrial engineer; J. W. Warren, vice-president of Southern Cast Stone Co., is vice-president; and David M. Groves, former TVA assistant treasurer, is secretary-treasurer.

Washington U., Mines Bureau Offer Research Fellowships

The School of Mineral Engineering, University of Washington, Seattle, in cooperation with the Northwest Experiment Station, U. S. Bureau of Mines, has offered five fellowships in research in nonmetallic minerals and coal, each good for 12 months, beginning July 1 or September 1.

For the fellowships in nonmetallics the work will be concerned with problems in the beneficiation of industrial minerals and ceramic materials.

Construction of a $500,000 storage bin and packhouse for the Huron Portland Cement Company was begun at Green Bay, Wis., in March by the Edward H. Meyer Construction Company of Neenah, Wis., contractors.

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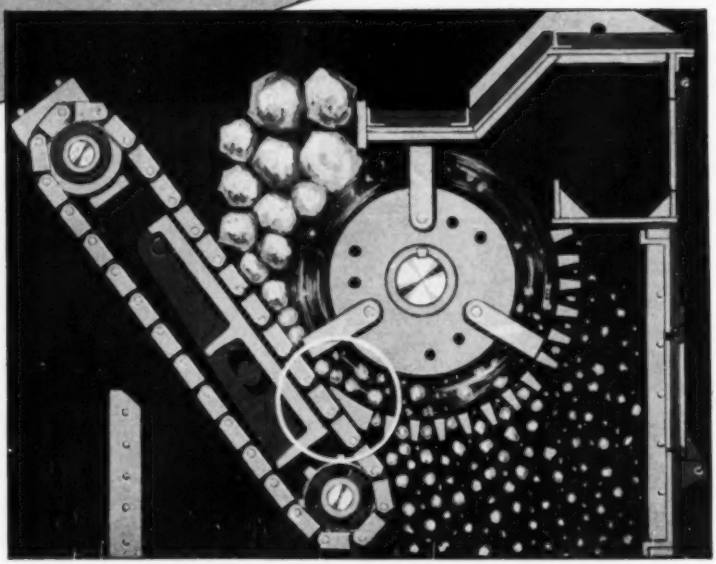

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* *U. S. Patents Granted & Pending*

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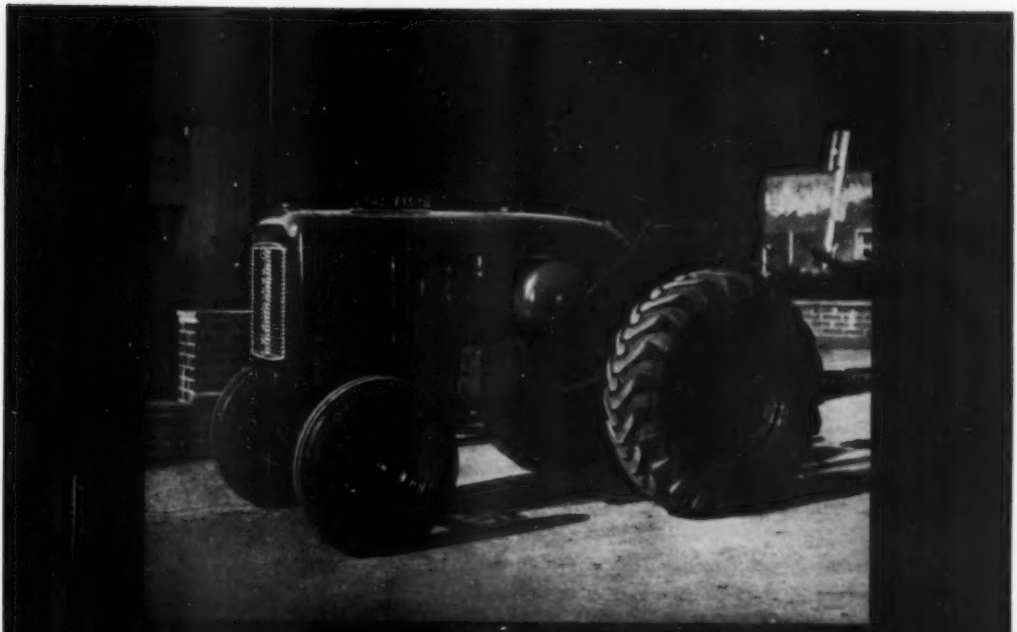

The Pneumatractor

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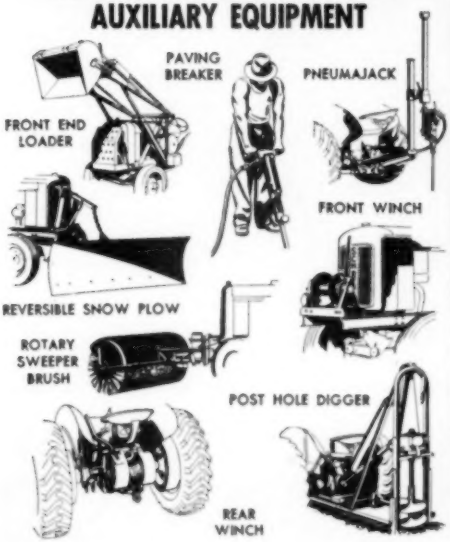

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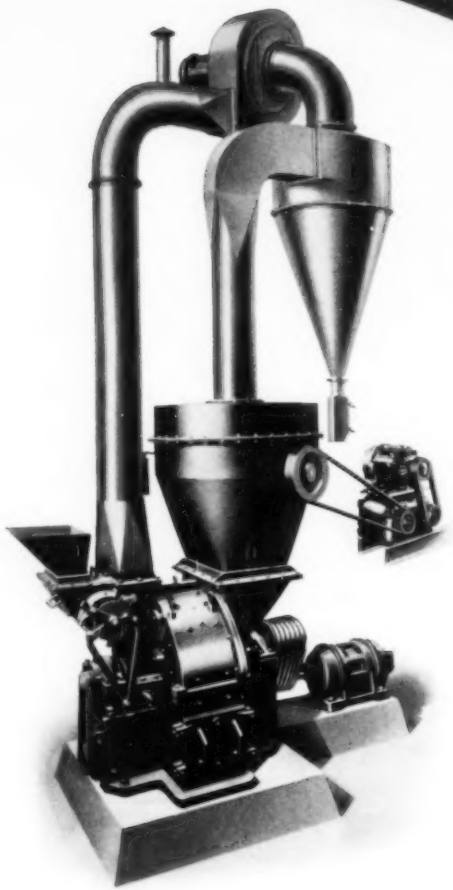

The Raymond Whizzer equipped Imp Mill has an unusually wide range of applications in the non-metallic industry because of its ease of control, and maintenance and operating economy.

Flash Drying Accessories make this Unit applicable for handling high moisture clays and similar materials. Drying, pulverizing and separating are combined in a single unit of equipment. A uniform finished material is produced without the use of separate dryers.

Close control is assured over the finished product both in fineness and moisture content. One simple adjustment provides wide range fineness control up to 99% or better passing 325-mesh. Automatic temperature controls maintain the final moisture of the product at any desired percentage.

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RAYMOND builds a complete line of Roller Mills, Bowl Mills, Automatic Pulverizers, Screen Mills and Mechanical Air Separators for the non-metallics industries

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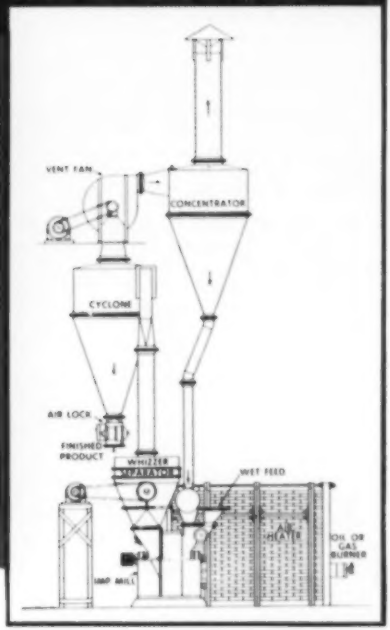

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This flow sheet shows a typical arrangement of the Imp Mill with Flash Drying System for simultaneous drying, grinding, and classifying clays and similar materials with initial moisture.

As a typical example using one of these units, a Raymond #53 Imp Mill is, in one case, producing 9300 pounds of fire clay per hour at a fineness of 96% passing 100-mesh. The initial clay contains 23% moisture, which is reduced, by means of Flash Drying accessories, to 3% or below in the final product.

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REVOLUTIONARY IN DESIGN

The Joy Champion Drill continuously pressure-cuts the rock with a rotating tri-cone roller bit. All other types of blast-hole drills depend on interrupted hammer strokes to chip the rock.

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The Joy Champion will drill to any quarry depth desired. Depth of hole has no effect on straightness of hole or on drilling speed.

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With the Joy Champion, you are assured of finishing every hole you start. The rigid drilling stem, controllable feed-pressure and rotation speed prevent bit wander. Cracks, fissures, clay or loose rock do not deflect or stop this drill. You always complete the hole.

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The Joy Champion drills a 5⅝" to 7⅞" hole as straight as a gun barrel. Smooth-walled holes insure easier, safer powder loading, and better fragmentation.

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Joy Champions are mounted on sturdy crawler treads which minimize moving time.

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The Joy Champion comes in two sizes—the HEAVYWEIGHT and the MIDDLEWEIGHT. Either model, in its field, far outperforms any other drill on the market.

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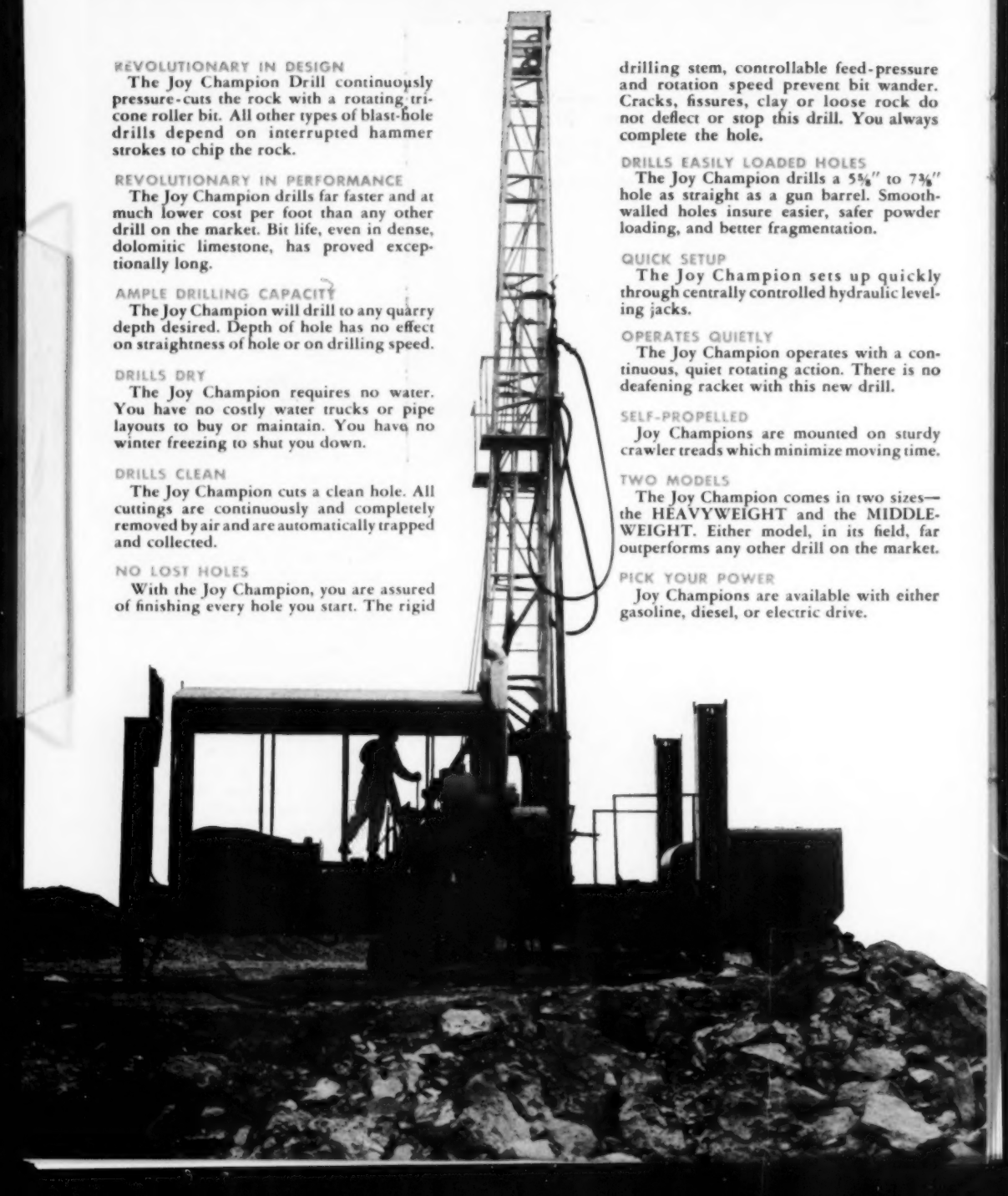
Joy Champions are available with either gasoline, diesel, or electric drive.



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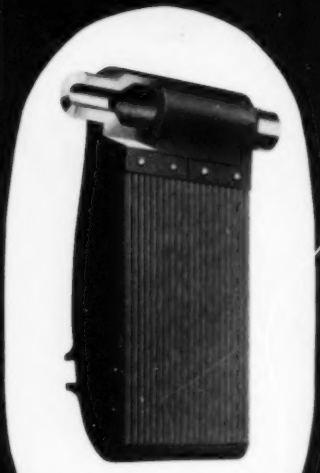

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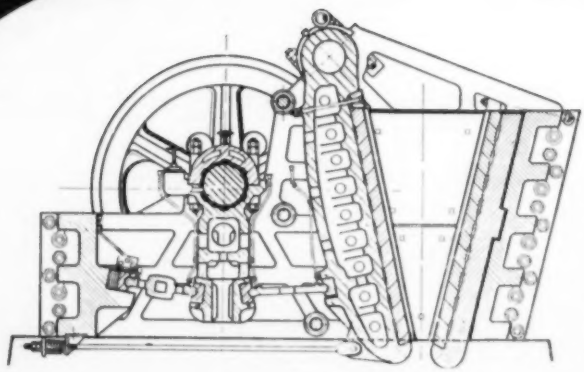

Scale drawing of Kennedy Swing Jaw Crusher.

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This Pennsylvania Firm Has Produced Agstone and Mineral Feed Since 1914

• Harry K. Landis, founder and president of the Landis Stone Meal Co., and his son, Stehman Landis, who is general superintendent of the plant.

ON THE SPOT

OUR conception of the recent origin of agricultural limestone production as a full-scale business enterprise received a rude jolt not long ago when we called on Harry K. Landis, president and founder of the Landis Stone Meal Company, located at Rheems, Pa., about midway between Harrisburg and Lancaster. His company, Mr. Landis told us, has been producing agstone, poultry grits, and stone meal continuously since 1914, making it certainly one of the very first, as well as one of the oldest still active, entrants in the field.

In 1938, when the government purchase and distribution program was instituted, the Landis company had been firmly entrenched in the field for almost a quarter of a century. The business was launched just 40 years ago to produce aggregates, but by 1914 all production had been channeled into farm materials. Mr. Landis, who has directed the company's activities from the start, is justly proud of the fact that for the past 30 years there hasn't been a single shutdown or layoff for any reason.

The deposit adjacent to the Landis plant is a very white high-calcium limestone which averages about 94 percent total carbonates, and 52 percent total oxides. Its extreme whiteness suggested the "White Lily" trade name under which the product has been marketed for a number of years.

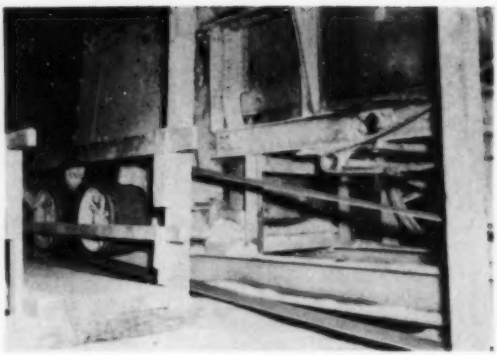
The deposit is worked in two 40-ft. benches, and snake holes are used exclusively in blasting operations. These are made with a Cleveland wagon drill, and 12 to 14 holes are shot on an average of once a month the year around. About 25 percent of the material brought down in the primary shots requires secondary drilling and blasting.

Stone is recovered with a ¾-cu. yd. General gasoline-powered shovel and loaded into a small cable car which operates on narrow-gauge rails. A single drum hoist located in the plant proper hauls the car up an incline. At the top two rails engage wheels at the rear end of the car to tilt it forward and discharge its contents into an apron feeder. The feeder delivers the stone to a New Holland Model 3030 double-impeller impact crusher. This unit is made to serve as both a primary and a secondary crusher by operating it in closed circuit with a vibrating screen located at the top of the plant. The discharge from the crusher is elevated and delivered to a 3- by 6-ft. triple deck New Holland screen, from which the plus 1½-in. stone is returned to the crusher by means of gravity. The crusher is fed at the rate of about 50 t.p.h., and when necessary it can be used at somewhat lower capacity to reduce all the material to ¼-in.

Most of the agricultural limestone produced by Landis is ground with a Bradley Type "B" Junior Hercules mill. This self-contained mill receives ¾-in. stone and reduces it to the desired fineness in one operation, without further screening or other processing. As operated by Landis it produces at the rate of 5 t.p.h. Screen analysis of the end product shows 100 percent passing 20-mesh, 90 percent passing 100-mesh, and 40 to 45 percent passing 200-mesh. Fineness can be regulated by changing the internal screen through which the pulverized material is discharged.

• A general view of the Landis Stone Meal Company's plant at Rheems, Pa. At the left is the rail incline on which stone is hoisted from the quarry.

• Stone is loaded by a ¾-cu. yd. gasoline shovel into the small car at the right.



• Above, left: Drilling a snake hole on one of the 40-ft. ledges of the quarry.

• Above, right: By operating this double-impeller impact crusher in closed circuit with an overhead screen, it is made to serve for both primary and secondary crushing.

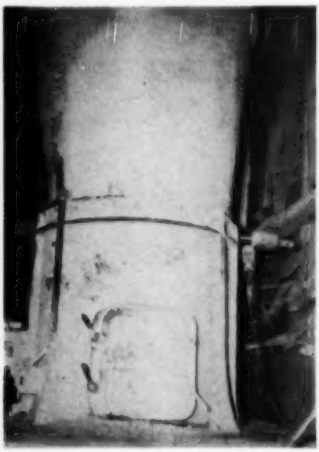
A second mill in the plant is used primarily for producing the more finely ground limestone which the company mixes with other materials to make its "White Lily" brand stone meal. This is a Raymond roller mill equipped with air separation on the mill proper, and a cyclone collector and a return-air piping system. Air entering the mill under the grinding ring passes upward through the material, picking up the fine and medium-fine dust made by the rolls and conveying to the separator. There the fine material is separated from the medium and coarse before going to the cyclone collector where it is discharged, the air being returned to the mill. The coarser particles are returned to the mill for further grinding.

The Raymond mill pulverizes at the rate of about 3 t.p.h., reducing the material to 80 percent passing the 200-mesh sieve. This product is elevated into bins from which it is fed to a conventional feed mixer, where it is blended with other materials to make a complete mineral food product. The calcium content of the end product ranges from 29 to 32 percent, the remainder consisting of not over 10 percent of salt, and varying amounts of di-calcium, mono-calcium, and di-sodium phosphate, meat and bone meal, iron oxide, iron, cobalt, copper and manganese sulphate, stabilized potassium iodide, plant sterol, and anise oil. All ingredients except calcium are purchased from outside sources.

All of the stone meal and at least 50 percent of the agricultural limestone are packed in 80-lb. paper bags by means of a St. Regis two-spout bagging machine. By bagging so large a proportion of its agricultural limestone, the company has some degree of independence so far as weather conditions in relation to

(*Continued on page* 104)

• A view of the self-contained mill which reduces ¾-in. stone to 100 percent passing 20-mesh in one operation. The product of this mill, which produces at the rate of 5 t.p.h., is all marketed as agricultural limestone.



• Limestone for use in mineral feed is pulverized in this roller mill, which operates in conjunction with an integral air separator on the mill proper, and a cyclone collector.

• One of the Landis company's fleet of six spreader trucks being weighed on the platform scale at the plant.

Life Can Be Beautiful— Even At an Agstone Plant

another ON THE SPOT report

EVER wish you could get away from the daily grind and settle down in some scenic spot where the fishing and hunting was good, where you could have a nice little business that assured a comfortable living without taking up too much time? Haven't we all!

Last summer while on a trip through the state of Washington, we ran across a setup that comes about as close to this ideal as we have yet encountered in the pit-and-quarry field. Nestled in a quiet little valley in the towering Cascade wonderland near the town of Goldbar, we met Mr. and Mrs. Leslie B. Miller, who own and operate the Miller Lime Company.

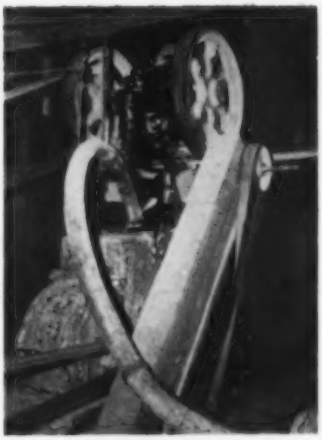
The Miller plant is small, producing about 10,000 tons of ground agricultural limestone annually. But it is a marvel of efficiency and is highly automatic in operation, allowing the Millers plenty of off time to hunt, fish, garden a bit, and get a lot of fun out of life in general. A mountain stream, dammed up to form a pond on the property, has been well stocked with hungry rainbow trout. If the Millers want a fish dinner the easy way, they pick up a rod and catch enough for a meal in a matter of minutes. Many natural lakes and streams close by afford them a variety of sportier fishing, however. There are deer and other big game in abundance.

The stream that forms the private trout pond also provides plenty of pure, fresh water which is piped to the Millers' comfortable home. Its power, too, has been harnessed, a water wheel driving a generator to supply plenty of electricity for lighting and powering home appliances.

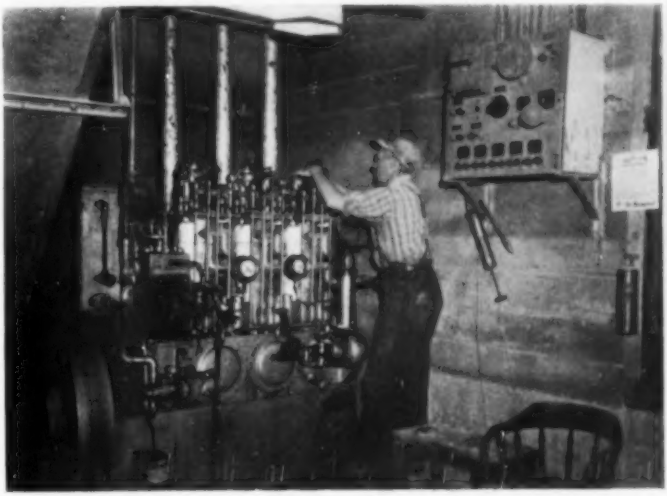
The small quarry is ¾ mi. away and a couple of hundred feet higher than the plant itself. The stone is trucked to a 110-ft. long covered chute which runs downhill to feed, by gravity, the Reliance 18- by 24-in. jam crusher at the plant. The crusher is set at 1¼ in., and the product goes directly to a Lippman hammermill for pulverizing. An inclosed drag conveyor carries the hammermill product to a 3- by 6-ft. vibrating screen in a dust-tight room. All plus-10-mesh material is returned by another inclosed drag conveyor to the hammermill. Screen throughs pass directly to a 100-ton inclosed truck-loading bin as finished product. A separate gate and spout are used for packing part of the output in 100-lb. paper bags.

The plant is a marvel of cleanliness, for every piece of equipment is enclosed and operating under vacuum created by a suction fan. Abso-

(*Continued on page* 104.)



• The jaw crusher and the hammermill. The suction hose keeps equipment dust-free.



• Mr. Miller checks his power plant, a 45-hp. diesel. An automatic signal board on the wall flashes warning lights in case of trouble.

• Below: The agricultural limestone plant of the Miller Lime Company in the Cascade Mountains near Goldbar, Wash. The stone is fed by gravity through the long covered chute on the hillside.

Millard Completes Expansion

By WILLIAM M. AVERY

Vast program at Annville Plant includes extensive quarry work, a third rotary kiln, and a fine modern washing and screening plant

View into the west quarry shows the primary crusher building at the left, and a portion of the inclined conveyor which delivers stone to the washing plant.

E. D. Williams, president and general manager of the company, has been closely identified with operations for more than 20 years.

WITH the recent completion of a major program of expansion and improvement at its principal lime plant in Annville, Pa., the H. E. Millard Lime and Stone Company has reaffirmed its belief in the future of the great industry of which it is a part. In addition the company has materially buttressed its long-held position as one of the major components of that industry. The increased capacity of the Annville plant, combined with the output of other properties located at Hershey and Palmyra, Pa., bring the company's total production of high-calcium lime and limestone products to well over 5,000 tons daily, making it one of the largest commercial operations of its kind in the entire country.

The Millard quarry interests were established at North Lebanon, Pa., in 1880, and the Annville plant, which was later to become the center of the company's operations, was started at the turn of the century. The major steps in the steady expansion of the Annville operations have been faithfully reported in these pages over a period of many years, and the program which has just been completed may be properly treated and regarded as just another milestone in the history of a vigorous and progressive concern.

Unfortunately these remarks will not be read by the man who was chiefly responsible for the phenomenal growth of the Millard quarry interests. Just a few days before we visited Annville for the series of interviews on which this article is based, Harry E. Millard, president of the company which bears his name, and its guiding genius for almost half a century, passed away at his Annville residence. His death at the age of 75 brought to a close one of the most colorful careers in the lime industry. Mr. Millard joined his father, the late J. B. Millard, in the quarry business shortly after the Annville property was opened. A few years later he took over the active management of the company, and it was under his close personal supervision that the enterprise grew to become one of the giants of the industry. He was active in the affairs of the company until about two years ago, when failing health compelled him to pass all the burdens of management to others.

The company's new president is E. D. Williams, who has served as vice-president and general manager for a number of years, and who has been closely identified with the operations of the company for more than 20 years. The vast expansion plan which is the subject of this report was conceived and carried out by Mr. Williams.

This general view of the Annville plant shows the new washing plant on the right, the old screening and washing towers in the center, and the burning plant and finishing section at the left.

The modernization program at Annville, which is now in the final stages of completion, was initiated just about four years ago with an extensive program which was then limited to the quarry itself. This work, most of which was completed late in 1946, assured the output of the vastly increased quantities of raw stone which would be required for the increased processing facilities to be installed later.

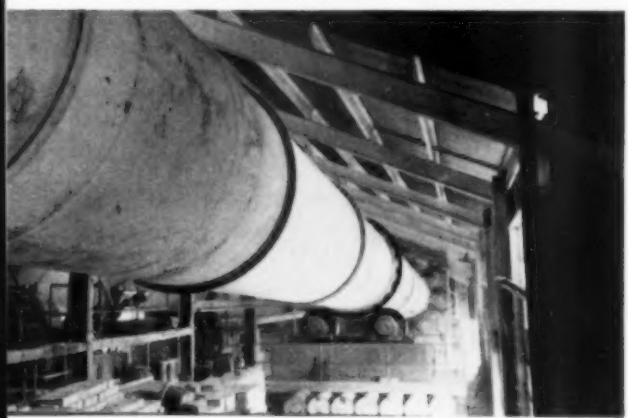
By September of the following year (1947) another important stage of the program was completed with the firing up of a new rotary kiln. This installation was made adjacent and parallel to the existing burning plant, which consisted of two 6½- by 8- by 290-ft. F. L. Smidth rotary kilns, one installed in 1937 and the other in 1940. The third kiln is also an F. L. Smidth unit, but the shell is somewhat larger than the other two, being 8 ft. in diameter throughout the entire length of 317 ft. 6 in. Due to the greater diameter and length, the capacity of the new kiln is about 200 tons per day, as compared with 150 tons per day for each of the older units.

The third and final phase of the program, which is now virtually completed, involved the construction of an entirely new plant for washing, screening, and secondary crushing. This new processing unit is located at the east end of the plant, and it is fed directly from the quarry floor by means of a long, inclined belt conveyor. Here there are ten 400-ton reinforced-concrete bins for storing the various sizes of stone.

Quarry Program

The quarry phase of the Millard expansion program was covered by PIT AND QUARRY in some detail while the work was still in progress,[1] but the high spots will be reviewed here in order to provide a complete picture of what has been done. For many years the quarries which supply the Annville plant were entirely dependent on rail haulage, with 6-ton side-dump cars operating on narrow-gauge tracks. As the quarry development progressed, recovery operations were finally carried on simultaneously in three long, rather narrow cuts, strung out east and west for a distance of a mile and a half, and interconnected by means of tunnels.

[1]See Avery, William M.: *Millard Finds Modernized Haulage and Crushing Methods Profitable*, PIT AND QUARRY, April, 1946, page 82.



The new 8-ft. by 317-ft. 6-in. rotary kiln which was installed as part of the expansion program. This view is from the drive platform looking toward the discharge end.

An important phase of the quarry program was the replacement of rail cars with these quarry-type rear-dump trucks.

Earnest D. Williams, vice-president of the company.

When the work of maintaining tracks became too burdensome, a gradual shift to truck haulage was begun. In 1942 the first quarry-type rear-dump Euclid trucks, powered by 150-hp. Cummins engines, were placed in service. By 1946 about 75 percent of the total tonnage was being moved by truck and the remainder by means of the side-dump cars. Since the primary crusher was located in the most westerly of the three quarries, the nine Euclids then in service were used mainly for the long haul from the east quarry. After the present expansion program got under way, two additional Euclid trucks were purchased, and rail haulage was abandoned altogether. Each of these trucks is said to haul a payload of 18 to 20 tons.

Since the expansion program which took shape in 1946 anticipated more than doubling the processing capacity of the then existing plant, there was obviously a need of an almost immediate increase in primary crushing capacity. The existing primary crusher was a No. 10 Kennedy-Van Saun gyratory located in the east end of the west quarry, about opposite the screening plant. Stone moved from this crusher to an open storage bin over a Kennedy-Van Saun skip hoist of about 3 tons' capacity. By this means the material was delivered to the top of the quarry for further processing.

Since this set-up was satisfactory from every standpoint except capacity, it was decided to retain it, and to obtain the needed additional capacity by installing a second primary crusher. This installation was made on the opposite side of the roadway across from the original crusher. It consists of a No. 30 Kennedy-Van Saun gyratory which is fed through a 2½-in. grizzly by a 42-in. by 32-ft. Link-Belt apron feeder. The feeder was so situated with respect to the roadway that trucks could dump to it from either side and cars from the end.

The new gyratory discharged onto a Link-Belt 36-in. by 240-ft. inclined belt conveyor which placed the stone in bins for reloading into the trucks that hauled the material to the plant above. This installation was made with full knowledge that eventually, upon completion of the new washing and screening plant, primary stone would be removed from the quarry by means of a long inclined belt conveyor. This conveyor, which is now in service, will be described later.

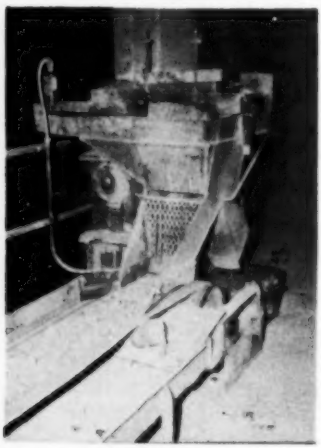
Except for haulage methods, general quarry practice at Annville has undergone little change over a period of many years. All primary drilling is done with well drills, and loading at the various working faces is done with four Marion 37's, a Lorain 75, and a Bucyrus-Erie 42-B. Most of the secondary breaking ahead of the primary crushers is done with drop balls, but occasional large blocks of stone require secondary drilling and blasting.

The stone deposits are in the Cambro-Ordovician limestone ledge which underlies the entire Lebanon Valley. The stone is said to average 96 to 97 percent calcium carbonate with a very low silica content—one of the finest high-calcium limestones in the country. At Annville the vein extends from east to west for a distance of approximately five miles. Where the main operation is now concentrated the width of the vein is about 300 ft., and the floor has been worked down to a depth of about 150 ft. below the surface.

New Rotary Kiln

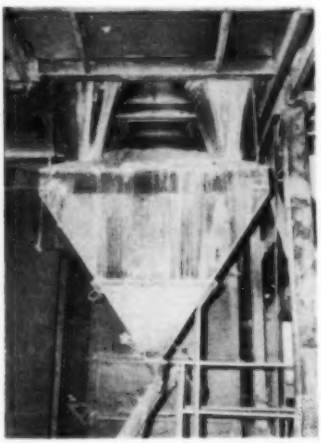
With a few minor exceptions the new rotary kiln installation at the

[2]See Trauffer, W. E.: *H. E. Millard Builds World's Most Modern Rotary-Kiln Lime Plant*, PIT AND QUARRY, August, 1937, page 41. Also: *Second 250-Ft. Rotary Kiln Installed in Millard Lime Plant at Annville*, PIT AND QUARRY, June, 1940, page 26.



The rotary feed table ahead of the new kiln delivers stone to an 18-in. by 30-ft. conveyor which discharges into the kiln feed pipe.

The kiln is fired with this direct-firing bowl mill which has an integral fan for drawing air from the kiln hood to dry the coal. A similar unit fires the two older kilns in parallel.

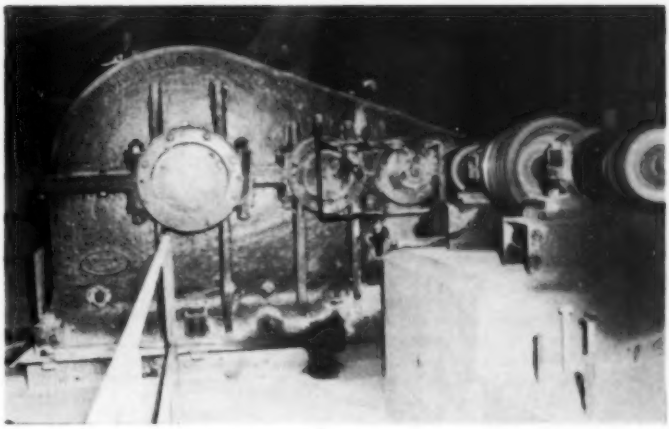


Both the stack and the stone dryer are vented to this quadruple dust collector, which recovers about 30 tons of dust per day.

Millard plant closely parallels the two earlier installations, which were fully described in these pages at the time they were made.[2] The earlier installations incorporated types of equipment and operating methods which had formerly been used only in the cement industry. Accordingly they constituted a truly revolutionary development in lime burning. The soundness of design and equipment selection are indicated by the fact that one of the most progressive companies in the industry has found no need for any major change in the 13 years since the first unit was placed in operation.

Stone for the older kilns was obtained from either of two plants, one a dry-screening operation and the other a wet-screening and washing operation. The skip hoist from the quarry delivers stone to the dry plant at the rate of about 200 t.p.h. There it is screened into the various sizes and delivered to a washing plant where contamination is removed. From this plant sized stone is loaded into cars for rail shipment, into trucks for delivery or stockpiling, or into the 40-cu.ft. Link-belt counterbalanced skip hoist which supplies the kiln feed bins. Stone can also be fed from the dry plant into the skip hoist by means of an underground conveyor, thus bypassing the washing plant.

The stone is discharged over a triple-deck Kennedy-Van Saun vibrating screen located above the kiln feed bins. From this screen the flow is directed to the feed bins by means of separate belt conveyors, or to other bins for loading into cars and trucks, or to the agricultural limestone plant. This same arrangement applies to the new (or No. 3) kiln, for which a third Link-Belt cross conveyor was installed from the existing screen to a new 300-ton feed bin.



A view of the 148:1 gear reduction unit on the kiln drive.

The stone flows from the bin onto an F. L. Smith rotary feed table driven by a 4-speed motor which is synchronized with the kiln drive motor. The table discharges onto an 18-in. by 30-ft. Link-Belt belt conveyor, which in turn discharges into the kiln feed pipe. This conveyor was made necessary by the greater length of the new kiln. Except for it, the three installations are virtually identical at the feed end.

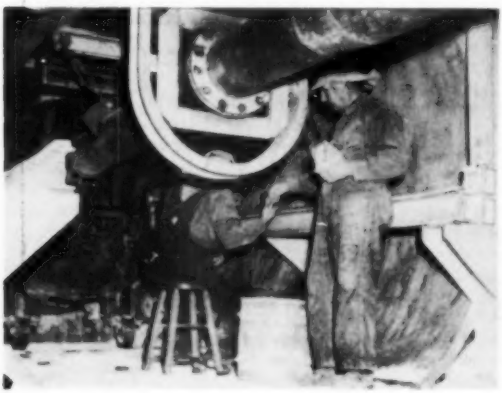
The No. 3 kiln which has been referred to as "new" was actually installed and operated for a few months during the war in a magnesium plant at Lake Charles, La. It is an F. L. Smidth all-welded kiln measuring 8 ft. 2 in. in diameter by 317 ft. 6 in. in length. Except for re-equipping the firing end for burning pulverized coal, no changes were made when the shell was reassembled at Annville. It has a single row of ten 36-in.-diameter alloy-steel Unax coolers which are about 17 ft. long and extend about half their length back from the discharge end.

The kiln, which has a pitch of ½ in. per ft., is supported on five concrete piers by as many sets of F. L. Smidth cast-steel, water- and oil-cooled trunnions. It was delivered to Annville in five sections, which were simply butted together and welded by Millard's own men. In spite of this somewhat daring procedure, no trouble was encountered either during the installation period or after the kiln was fired.

It is driven by a four-speed, 50-hp. General Electric motor, through six gates Vulco Rope "V" belts to a 148:1 Philadelphia Gear Works speed reducer, and through a Falk No. 220 F. A. flexible coupling to a conventional pinion and floating girth gear set. With motor speeds of 1200, 900, 600, and 400

Below, left: A view of the firing end of the new kiln taken during ring shooting operations.

Below, right: The centralized control cubicle on which all controls for the new kiln and its appurtenant equipment are mounted.



r.p.m., the kiln speeds are respectively 1.25, 0.902, 0.625, and 0.463 r.p.m. Normally it is driven at the top speed of 1.25 r.p.m. Stand-by power is provided by a Lehman gasoline engine.

The four-speed motors on both the kiln drive and the feed table are synchronized by controlling them through a common switch. Any required variation in the relative feed rate is effected by adjusting the scraper setting on the feeder.

As in the case of the older kilns, the new unit is lined throughout with Harbison-Walker refractory brick. The first 58 ft. of the lining consists of 7½-in. "Duro" brick without insulation, acting as the heat exchanger section. Following this is 162 ft. of 4½-in. "Duro" on 2½-in. of Johns-Manville Superex insulation. The next 40 ft. of lining consists of "Varnon" brick, the first 21 ft. being insulated with 2½-in. of Superex. This is followed by 40 ft. of 7½-in. "Alusite" 70-percent alumina. The last 17 ft. is lined with H-W "Special" 40-percent alumina, ranging from 9 in. adjacent to the discharge port to a maximum thickness of 24 in. There is a dike at the feed opening to prevent stone from spilling out the end of the kiln. There are no lifter blocks in the heat exchanger section.

The new kiln was first fired on September 3, 1947, and it was operated continuously without a single shutdown for any cause until August 2, 1948. This remarkably long initial run is at least in part attributable to the extreme care exercised in the lining job. After the lining was in place, the best masons in the plant went into the kiln and painstakingly checked the entire job. The kiln was periodically turned about 1/6 of a revolution while this work was in progress to facilitate finding and regrouting all loose bricks. As a final precaution, the entire lining was swept from end to end with Harwaco Bond.

The value of such precautions is further indicated by the fact that in 31 months of operation the kiln has been out of production only 12 days, this period representing the total lost production time in 3 shutdowns. The company keeps detailed, progressive records of the conditions found and the work done during every shutdown, so that over a period of time practice is amended to assure the maximum life from the kiln linings.

No major changes in the coal-handling setup were required by the recent expansion of the burning

Casper Arndt, general superintendent of the Millard plants, and John R. Bomberger, quarry and crushing superintendent at Annville.

plant. Coal is received in bottom-dump cars, and these are discharged into a track hopper below which there is a 24- by 24-in. Jeffrey single-roll crusher. A conveyor moves the crushed product to a 50-ft. Link-Belt bucket elevator which discharges either into a 300-ton storage silo or onto a 20-in. shuttle belt conveyor feeding the coal bins ahead of the kilns. Coal is reclaimed from the storage silo through five discharge gates located over a 20-in. tunnel belt conveyor which terminates at the bucket elevator.

For the No. 3 kiln a new 100-ton fed bin was installed ahead of the pulverizer and the necessary extension made to the 20-in. shuttle conveyor above. The kiln is fired with a No. 372-A. Raymond bowl mill which has an integral fan for drawing air from the kiln hood to dry the fuel. At a fuel ratio of about 4 to 1 this pulverizer processes about 3 tons of coal per hour without forcing.

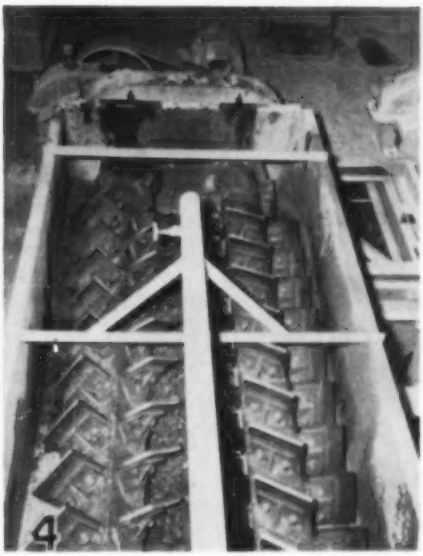
This mill operated so satisfactorily that a short time after it was placed in service an identical unit was ordered for firing the No. 1 and 2 kilns. The use of one mill to fire two kilns is made possible by utilizing air from both kiln hoods to dry the coal. Any desired amount of air can be used from either hood, and a very fine division of the fuel going to either kiln can be made by means of a damper. Due to the greater amount of heat available for drying the coal, the mill which supplies No. 1 and No. 2 kilns pulverizes about 50 percent more fuel than the unit which feeds No. 3 kiln. Both mills are said to be doing an excellent job without regard to the occasional high moisture content and poor quality of the coal fed to them. The F. L. Smidth fans installed with the original direct-firing coal mills for the two older kilns are used with the new mill.

The induced draft for No. 3 kiln is supplied by a 50-hp. Buffalo Forge fan which draws air from the feed end of the kiln, the draft being controlled by means of a louvre damper operated from the firing floor. The fan discharges into a chute-type stone dryer or into a 51-in.-diameter metal stack. Dampers in the "Y"-shaped connection make it possible to direct all of the air into either of these units, or part of it into each.

Both the stack and the stone dryer (which has an exhaust fan on top) are vented to a quadruple Buell van Tongeren cyclone dust collector which recovers about 30 tons of dust per day. This performance was so superior to that obtained with the conventional dust chambers installed with No. 1 and No. 2 kilns that in the winter of 1947-48 Buell collectors were installed on these units. When all three kilns are in full production the three collectors recover about 75 tons of dust every 24 hours. The outlets of the three collectors are connected to a Fuller-Kinyon pump which discharges the material into the storage silos for agricultural limestone.

The stone dryer referred to is a square tower built of concrete masonry units with a firebrick lining. Here the 700- to 750-deg. F. kiln discharge air is used to dry limestone screenings at the rate of about 12 t.p.h. The chutes down which the stone slides consist of 12-in. structural channels. There is a 250-ton surge bin ahead of the dryer to accommodate the excess of screenings produced when the stone plant is operating. This excess is dried during the 16 hours of each day in which the stone plant is idle. The discharge air from No. 1 and No. 2 kilns is similarly utilized by exhausting it through a single baffle-type stone dryer located between the two kilns. This unit also has a capacity of about 12 t.p.h.

All controls for the No. 3 kiln and its appurtenant equipment are mounted on a centralized control cubicle located on the firing floor. These include a kiln speed recorder, CO_2 and $CO + H_2$-percentage indicators and recorders, pyrometers for recording coal mill inlet and outlet and dust collector temperatures, draft gauges for both ends of the kiln and for the coal mill, and the various controls and other gear for a fully interlocked system. There is also a telephone for communication



1. Looking down the 36-in. by 750-ft. inclined belt conveyor which delivers stone from the quarry to the new washing plant.

2. One of the 5- by 12-ft. vibrating screens in the washing plant.

3. The 16-in. by 15-ft. double-screw sand washers from which fines are discharged into storage bins.

4. Minus 4-in. stone passes through 35-in. by 30-ft. dual log washers.

between the firing floor and the feed end of the kiln.

Calcined lime is discharged from the Unax cooler onto an F. L. Smidth Skipulter conveyor which in turn drops the material onto either of two lateral apron conveyors. These discharge into either the new Link-Belt skip hoist, or into the older skip hoists which serve No. 1 and No. 2 kilns. From this point on the product of No. 3 kiln is processed in the same system that serves the two older units. No important changes have been made in the hydrate and loading end of the plant.

As in the two older installations, debris from No. 3 kiln can be disposed of without manual handling. By merely throwing a flop gate, scale and other debris can be discharged either from the cooler or from the end of the kiln directly onto a pan conveyor serving all three kilns. This conveyor discharges into an elevator at the side of the building, from which it drops directly into a dump truck, or into a small surge bin with sufficient capacity to handle the material that accumulates while the truck is being dumped. Bad lime removed by inspectors at the Skipulters is also disposed of in the same manner.

The older kilns at Annville each produce about 150 tons of lime per day, while the new kiln averages closer to 200 tons per day, the difference being largely a result of the somewhat greater diameter and length. There is no qualitative difference in the material produced by the three units. The new kiln has been burning the best grade of 1¼-in. stone, and most of the product has been marketed as pebble lime. The excellence of the product is indicated by the fact that the residue on a 50-mesh screen has been consistently around 1½ percent.

The entire kiln installation was made by Millard's own forces without any interruption in the operations of No. 1 and No. 2 kilns. After No. 3 was in production, the other two kilns were shut down briefly while the new Buell dust collectors were cut in. To house the new kiln and appurtenant equipment an extensive addition was made to the north side of the existing rotary kiln building.

New Washing Plant

Millard's new washing plant, which was already in production at the time of our visit, is located somewhat east of the other plant structures on the property. It is supplied entirely from the No. 30 Kennedy-Van Saun primary gyratory crusher. A fully enclosed 36-in. by 740-ft. Iowa Cedarapids belt conveyor rises steeply from the truck-loading station on the quarry floor to the top of the new plant, a total rise of about 280 ft. This conveyor has a capacity of about 500 t.p.h., and its installation obviates the need for trucking anything but waste material out of the quarry.

The conveyor, which is equipped with a Goodrich belt, discharges onto a 5- by 12-ft. single-deck Allis-Chalmers Ripl-Flo screen, or the screen can be by-passed and the entire flow channeled directly into the washing circuit. The material first passes through an 8-ft. diameter by 24-ft. long scrubber of Millard's own design. This unit is lined with managanese steel plates, and the 4-in. angles which comprise the flights are hard-faced on the edges to hold wear to the minimum. Since the scrubber was placed in operation last August, periodic inspections have failed to reveal any serious wear on the interior working surfaces. The shell is supported on F. L. Smidth water- and oil-cooled trunnions, and it is driven at 23 r.p.m. by a 250-hp. General Electric motor through a Falk speed reducer and a conventional kiln gear and pinion set.

The scrubber discharge passes over a second 5- by 12-ft. Ripl-Flo screen which channels the plus 4-in. stone and tailings into separate storage bins, and the minus 4-in. stone to two 35-in. by 30-ft. Allis-Chalmers dual log washers. A Link-Belt conveyor on which the log washers discharge reverses the direction of flow of the material and re-elevates it sufficiently to discharge the stone on a 4- by 10-ft. Ripl-Flo screen. From this screen 1½-in. and 2-in. stone are conveyed separately to storage bins, while the fines drop onto the fourth and final screen in the circuit. From this screen, a 4- by 14-ft. Ripl-Flo, the ½-in. and ¼-in. stone go to storage bins, while the fines drop into two 16-in. by 15-ft. Allis-Chalmers double-screw sand washers, which also discharge into storage bins.

Water for the washing plant is pumped from the quarry by a 125-hp. 1500-g.p.m. Ingersoll-Rand 270-ft. static-head pump. Slurry, which is disposed of in a nearby abandoned quarry, is handled with a Morris Model 5S slurry pump driven by a 125-hp. General Electric motor.

The bins, which form the lower 75 ft. of the 150-ft. washing plant structure, are of reinforced-concrete. There are 10 compartments in all, with an average capacity of about 400 tons each. The supporting side walls straddle a single-track siding on which either open-top railway cars or trucks can be loaded by gravity. A feature of the installation is the use of double-acting air cylinders to open and close all the bin gates. These are operated from an enclosed central control house from which the operator has an unobstructed view of the entire loading runway. Another provision for the comfort and convenience of employees is a modern automatic passenger elevator for access to the upper levels of the building.

The final stage of interlocking the new washing plant with the other processing facilities at Annville was still under construction at the time of our visit. A new No. 49½ Kennedy-Van Saun low-head secondary crusher had already been installed in an underground concrete pit adjoining the plant. Feed for this crushing unit, consisting of minus 4-in. stone and tailings, will be discharged through steel chutes in the adjacent bins.

Chief Chemist Harlin S. Kenney at work in the chemical testing section of the company's fine new laboratory.

The crusher will discharge onto a 30-in. by 508-ft. inclined Link-Belt belt conveyor. The conveyor will deliver the stone to an existing battery of Ty-Rock and Allis-Chalmers screens from which the flow can enter the existing kiln supply system or be channeled into storage bins. Within a few weeks, when these facilities are placed in operation, there will be available an adequate supply of premium washed stone in the required sizes for all three rotary kilns.

Other fairly recent improvements to the Annville property include two large, well-designed concrete masonry service buildings. The larger, measuring 75 by 208 ft., houses the plant offices, machine, electric and general service shops, laboratory facilities, and locker and shower rooms. The smaller building, a 70- by 196-ft. garage, is used to house all trucks and other rolling equipment when not in service.

Under the direction of chief chemist Harlin S. Kenney the new laboratory is being equipped to make the full range of A.S.T.M. tests, in addition to a number of other tests for furthering long-range objectives of the company. The three-man laboratory staff also runs slaking tests on daily kiln samples, chemical analyses for chemical and fluxing purposes, tests eight to ten samples per week of incoming coal and coke for total sulphur and ash, makes screen analyses of agricultural limestone samples, and carries on a number of other routine activities necessary for efficient production control. The main section of the laboratory is divided into separate rooms with facilities for physical testing on one side and for chemical testing on the other. Crushing equipment is located in a small enclosed room adjacent to the testing section.

In addition to the 500 tons per day of lime produced in the rotary kilns at Annville, Millard produces a total of about 250 tons per day in vertical kilns at the Swatara and Palmyra plants. Based on the usual proportion of 2 tons of stone to 1 ton of lime, the quarries produce about 1,500 tons of stone per day for lime production alone. Other stone products produced by the three plants total about 4,000 tons per day, of which the Annville plant now accounts for about 2,500 tons. Most of the lime produced is sold to the steel industry for fluxing purposes, and a sizable part of the stone output

(Continued on page 104)

New Crushed Stone Plant At Albany, Georgia, Supplies Local Demand

ARMENA Lime Mine & Farms, Inc., of Albany, Ga., is justifiably proud of its agricultural limestone plant.* This is still one of the relatively few operations in this country designed specifically for the production of agstone.

Very recently the demand for crushed stone for road purposes far exceeded the capacity of the quarrying and preliminary crushing operations at this plant. To fill these road orders, which heretofore had been only incidental to the agstone operation, the quarry operation was stepped up and the primary crushing and screening sections of the plant were rebuilt and enlarged.

At present the quarry is being worked on a 20 ft. face, and all drilling is done with Cleveland wagon drills. About 40 to 50 three-in.-diameter blast holes, in three rows, are loaded and detonated at one time. Because of the irregular stratification of the deposit, fragmentation leaves much to be desired. Therefore, considerable secondary shooting is necessary before the quarry stone is broken down to shovel size. Explosives costs are estimated to run around 4 cents per ton.

Excavating and loading out the shot stone is done with two shovels —a Northwest 1½-cu. yd. unit and a P & H 1-cu. yd. machine. Three F.W.D. 10-cu. yd. trucks, plus one International rear dump of somewhat smaller capacity, haul the stone from the working face to the primary crusher site about 1000 ft. away. The stone is dumped onto a Cedarapids feeder which precedes the 24- by 60-in. Maddox knob-roll primary crusher. Capacity at this point is 200 t.p.h. with a 6-in. setting. Material discharged from the crusher, minus 4-in. size, is elevated to the first screening structure on a 26-in. by 127-ft. centers belt con-

• Quarry stone being loaded into one of the new 10-cu. yd. trucks at the operation of the Armena Lime Mine & Farms Inc., near Albany, Ga.

• Looking at the top of one of the screening towers at Armena. Fines washed out at the screen are allowed to settle and are later recovered and sold as agstone.

*See Avery, William M., *Versatile Agstone Plant*, August, 1948, page 63.

• A general view of the enlarged rock crushing and screening plant placed in operation by Armena. It replaced the former plant designed specifically for the production of agstone.

veyor. All conveyors in the crushed stone plant were supplied by Barber-Greene.

A two-deck 5- by 12-ft. Telsmith vibrating screen separates the flow at the primary screening tower into plus 2-in. material, minus 2-in. plus 1-in., and minus 1-in. The oversize is chuted to a Williams pulverizer for secondary crushing; plus 1-in. minus 2-in. is passed over a washing screen where the dust is removed; and minus 1-in. material is conveyed on a 24-in. by 105-ft. belt to the second screening tower. Here another Telsmith 5- by 12-ft. double-deck vibrating screen splits the flow into ¾-in. and ⅜-in. stone. The ⅜-in. stone falls into a steel bin, from which it is drawn off in trucks and hauled to the raw storage shed preceding the agstone plant. The ¾-in. size is passed over a washing screen. In time the fines from the two washing screens are settled out, recovered and sold as agstone.

Crushed stone production averages about 150 t.p.h., including some 50 t.p.h. which is sent to the agricultural limestone plant. During periods of peak agstone demand, it is necessary to shunt some of the 1½-in. size stone to the aglime mill (in addition to the ⅜-in.) in order to supply the 75,000 tons of stone required in the agstone operation.

All equipment in the plant is electrically powered with present facilities representing a connected load somewhat in excess of 550 hp. Power is supplied from a 44,000-volt main line Georgia Power Co. circuit.

Miller Lime Company

(*From page 95*)

lutely no dust is in evidence anywhere. Power is supplied through shafting and belts by an Atlas-Imperial 45-hp. diesel engine. Mr. Miller has ingeniously equipped all machines and moving equipment with automatic switches which control a series of flasher lights on a central signal board. Should any trouble develop, it can be quickly located and corrected. At the same time an electric horn also sounds the alarm.

Actually, though, the plant is so well designed and maintained that trouble seldom develops; it just about runs itself. Mrs. Miller's father, W. F. Teubner, who makes his home with them, looks after the plant much of the time, has the title of "superintendent".

A large sign on U. S. Highway No. 2 west of Goldbar directs the visitor to the short road leading to the plant. Look for it if you happen up that way. Drop in on this bit of paradise for a chat with Superintendent Teubner. Chances are, the Millers may not be around. Probably gone fishing!

Millard Expansion

(*From page 102*)

goes to cement plants located in the Lehigh Valley.

In addition to Mr. Williams, who became president of the company upon Mr. Millard's death, the top management includes Earnest D. Williams Jr., vice-president, and Louis S. Alspach, secretary-treasurer. Casper Arndt is general superintendent, and John R. Bomberger is quarry and crushing superintendent. Mr. William's long and close association with Mr. Millard, in combination with the active role he has played in the management of the company over a period of many years, gives strong assurance that the sound policies which built up the Millard enterprises to their present peak will persist in the years to come.

City Building Construction Totals $7,400,000,000 in 1949

City building activity, led by a large volume of residential construction, was greater in 1949 than in any year since the mid-1920's, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. Urban building construction, as measured by building permits issued and federal contracts awarded, was valued at $7.4 billion in 1949, an increase of 6 percent over 1948 valuations, but somewhat less than the dollar volume in 1925 or 1926.

The entire increase between 1948 and 1949 in city permit valuations occurred in new residential construction, which rose by 11 percent to $4 billion. New non-residential building was about the same in both years (just over $2 1/3 billion), and addition, alteration, and repair work showed a 7 percent decline from 1948 to 1949.

Over 600,000 dwelling units were authorized by building permits in urban places in 1949—14 percent more than in 1948. The largest municipalities (those having a population of 100,000 and over in 1940) were responsible for almost two-thirds of the increase.

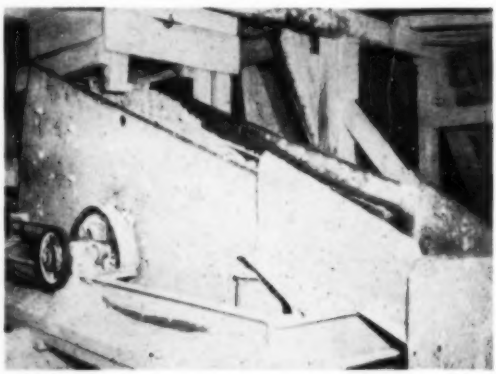
Landis Stone Meal Co.

(*From page 94*)

spreading operations is concerned. When prolonged wet weather makes it impossible to spread, it is a simple matter to step up the packing operation for a period of time, or channel more of the material into stone meal and poultry grits.

The coarse sizes of stone from the impact crusher can be sized on a four-deck, 2- by 6-ft. New Holland vibrating screen, elevated into bins, and spouted into 100-lb. paper bags for marketing as poultry grits. This is normally a winter-season business, and the plant facilities are so arranged that as much production as desired can be channeled into this relatively coarse material. During the spreading season all the material is pulverized for marketing as agricultural limestone or mineral feed for stock.

There are five bins in the plant with a total storage capacity of 600 tons. Since none of the pulverized stone is stockpiled, the bins determine the amount of material that can be accumulated for bulk delivery. The company operates its own fleet of six spreader trucks, equipped with Baughman, Even Spread, Highway Equipment, and Stoltcfus spreaders. It also operates three 15-ton tractor-trailer units for delivering the 30 to 40 tons per day of bagged materials produced. These trucks are used to deliver bagged agstone, mineral feed, and poultry grits in a seven-state area. The plant has no rail service. All power for operating the various items of equipment in the plant is supplied by International diesel engines, there being seven units which total 450-hp.



• One of the multiple-deck vibrating screens at the top of the Landis plant.

Nuisance Down Time Hurts Rotary Kiln Economy

By RALPH E. GIBBS
Consulting Engineer
York, Penna.

THE rotary kiln, its auxiliaries, and the performance of both, frequently have been discussed from the standpoint of their pure engineering features. The engineer's greatest interest seems to settle into distinct grooves directed primarily at maximum unit capacity and the minimum fuel consumption per ton of product. He also takes a keen interest in the means of bringing these to favorable values, and is forever searching for new and improved devices to this end. He will install gas analyzers to enable closer control of combustion. He will use pressure gauges to maintain optimum gas velocities throughout the system. He will apply thermometers and recording instruments in order that he may know the conditions attending each and every step in the process.

Of course, all these things are necessary if the operation of the unit is to be scientifically controlled. Judicious expenditures for essential operation-control devices, sensibly applied, are sound investments.

On the other hand, the technical control of the processing operation in the rotary kiln doesn't necessarily mean that this, in itself, will make the unit an economic success.

Engineering Management

Fully as important as process control of the rotary kiln operation is its engineering management. Besides the technical control of the process, the overall operation must be so managed that it is continuous and uninterrupted. Since the rotary kiln is the heart of the system, it must function continually if the system is to be economically healthy. When the kiln is not producing, the costs are going on and on while the means for meeting these costs have been cut off.

Down Time

The major causes of kiln down time cannot always be avoided. There are periods when the supply of product exceeds the market demand, and the kiln must be taken out of production. There are times too when the refractory lining is so deteriorated that a major repair must be made to it. It is true that these major interruptions—that is, major in point of length of down

Ralph E. Gibbs

time—affect the economy of the operation. These can, in a measure, be overcome or delayed; but it is the numerous small, unscheduled periods of down time that eat insidiously into the economical operation of the plant.

Nuisance Down Time

Appearing so unavoidable and insignificant as to be almost ignored by the operating crews, these nuisance down time periods frequently keep the plant from performing as it should. All those unscheduled interruptions to kiln operation will be considered as nuisance down time. They seldom exceed an hour in duration; many are not more than a few minutes at any one time. But in a good many installations the sum of the time lost to production because of these minor shut-downs makes a formidable total.

The management of the plant generally is fully aware of the cost of the major shut-downs, regardless of their cause. But this same management is not always aware of the cost of so-called minor, or nuisance down time. In many cases, when this cost of nuisance down time is shown in its proper light to the management, it is an eye-opener.

The reduction of kiln down time, those little, insignificant periods, the 15- or 20-minute stops while a loose foundation bolt is tightened or a ring-gear stud is replaced, depends largely upon the seriousness and the quality of the engineering management practiced in the plant. Where the practice is loose and uncoordinated, the periods of nuisance down time will be frequent and of comparatively long duration. Where the practice is well organized, the nuisance down time periods can be practically eliminated.

Cost of Nuisance Down Time

Management generally becomes conscious of this situation and responds accordingly when it is made to realize what this nuisance down time is costing. It is not difficult to approximate this cost. Simple arithmetic will serve. No complicated mathematics or highly involved accounting techniques are needed. For every hour of nuisance down time, multiply by the average hourly production rate, and again by the selling price per unit. Purely as an example, let it be assumed that the kiln has a capacity of five tons per hour and that the selling price of the product is $12.00 per ton. A nuisance down time period of one hour will cost at least $60.00. There you have it. If the demand for the product warrants a full year of operation, say 340 days, and with only one hour of nuisance down time per day, such an operation as in the example will suffer a loss of at least $20,000.00 per year.

The Role of Engineering Management

The writer is familiar with a case where it was the practice in the kiln plant for each shift to stop the kilns and auxiliaries for the purpose of lubrication. With flashlight in one hand and the grease bucket or oil can in the other, the burner and his helper scurried about the plant on the run to accomplish this chore in 20 minutes. Catwalks covered ankle-deep with dust, and ladders that had to be climbed with one hand, were added hazards to this routine. The army couldn't have devised a better obstacle course. Elevators, conveyors, kiln drives and trunnion bearings, and electric motors, all received this attention thrice daily. Thus an average of one hour's production time daily was lost forever because of two excellent plant regulations and an abominable system of engineering management.

One of the good plant regulations, among many others, was a regular

schedule of lubrication; the other was a safety measure that sternly forbade any man lubricating a piece of machinery while it was in operation.

There were three plants of two kilns each. The combined production capacity of these plants was about 350 tons per day, or 14.6 tons per hour. At the time this lubricating schedule was in effect, the product was selling for about $9.00 per ton f.o.b. cars. Thus this practice alone was costing the manufacturer approximately $131.00 per day of scheduled plant operation.

The solution of this nuisance down time problem was ridiculously simple, yet the management had tolerated it for years as a necessary evil. The old-fashioned grease-cups were eliminated and modern grease-gun fittings on extension pipes were installed. Oil cups were replaced with wick-oilers on extension tubing. The oil reservoirs and grease-gun fittings were located outside the safety guards along walkways, and were grouped wherever possible. This allowed the desired lubricant to be applied easily and quickly while the man stood beyond any danger point.

This simple piece of engineering management eliminated costly nuisance down time. It is in this manner that problems of engineering management must be approached.

In another instance the president of a refractory dolomite plant complained of the unduly high cost of refractory linings. He attributed this to the shut-downs every four to six weeks to replace the hammers or liners in the coal pulverizers.

This was one of the faults of the old-style pulverizers of the Aereo type. They did a good job while the hammers, liners and fan were in good condition. But after a few weeks of constant service, especially with a coal of inferior grindability, the coal delivered to the kiln became coarser and coarser until finally it had to be shut down for repairs.

Now it is a well-known fact that a kiln shut-down of several hours' duration, entailing a chilling and then a reheating, generally results in the spalling off of the coating in the hot zone which takes with it from one to three inches of the refractory kiln lining. With some types of 6-in. brick linings, not many such shut-downs can be tolerated before the lining needs a patch or a replacement.

The solution to this man's problem of high refractory cost was relatively simple. As a matter of fact there were two courses open, the choice depending upon the attitude of the company management. The first, and probably the least costly under the conditions at that time, was to install a duplicate pulverizer so that a spare was ready to go into operation at a moment's notice. The second possible solution was to install one of the costlier pulverizers that do not require repairs so frequently. Oh, yes! They are available. One such coal pulverizer installation with which the writer is familiar operated for more than two years almost continually without demanding repairs.

In still another instance the rotary kiln of a paper-mill lime recovery plant was suffering nuisance down time. Neither the operating crews nor management saw anything unusual in it until the costs were pointed out to them. Their down time items were considered to be simply peculiarities of their system, and little serious thought was accorded to rectifying the difficulties. One such down time period exceeding an hour's duration was observed. There was a great furor to get the immediate fault corrected, but no thought was given to the prevention of a recurrence. It was established that the same difficulties were taking place as often as several times a day.

The general industry, insofar as the lime-recovery plant of kraft paper-mills is concerned, favors discharging the lime from the kiln directly into a slurry-making tank. When the proper quantity of slurry of the desired consistency has been developed in this tank, it is pumped by centrifugal pumps to slurry storage tanks. In the plant under observation the pipe lines between the slurry tank and the pumps frequently became clogged. Until they were opened, the kiln had either to be slowed down or stopped until the line was reopened.

The solutions to this nuisance down time problem are several, and now that the seriousness of the problem is understood and costed by the management, some action will be taken.

This example, besides illustrating the manner in which engineering management is applied to rotary kiln plants, also shows the value of having the plant surveyed by an outside engineer who is competent to detect real problems of engineering management and who is capable of giving their solution.

In most cases the engineering management of rotary kiln plants is poorly organized, or not organized at all. In order to carry on effectively, the practice must be systematized. Nor is a haphazard, hit-or-miss arrangement much better than no system at all. The first place to commence organizing is not out in the plant, but in the main office. Management itself must become conscious of down time costs. Management must provide the machinery, the system under which an effective practice of engineering management can operate; it must have a sympathetic and understanding attitude for this work.

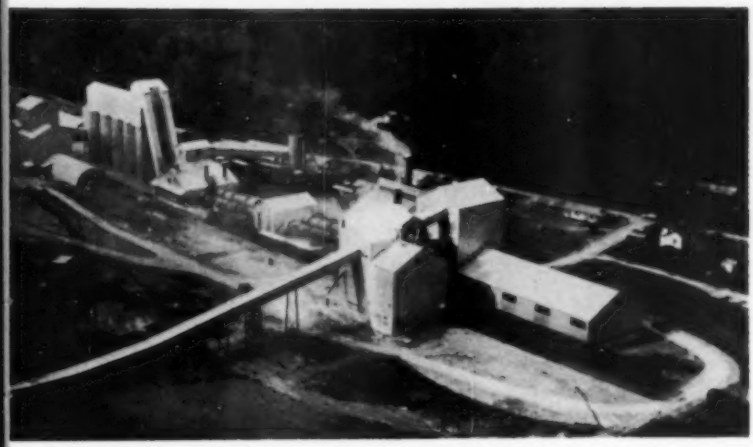
It is all very well to review the daily, weekly, or monthly reports on production and fuel consumption, and perhaps berate the plant operator because production is down and fuel consumption up; but these items in themselves are not the important things. Production and fuel consumption will take care of themselves. It is important to know the *what*, *why*, and *how* of unproductive or nuisance down time.

Management must take the initiative in any program to reduce nuisance down time. Although the plant operators generally are more than willing to cooperate on such a program, they are quite helpless to accomplish much by themselves. They will make suggestions and recommendations readily; but they don't control the purse-strings; they do not always have the authority to carry through a complete program, nor do they always have the ability. Unless their recommendations and suggestions are accorded the courtesy of acknowledgement and consideration by management, these helps will dwindle to the vanishing point.

Organizing to Reduce Nuisance Down Time

In the larger operations the organization may be headed by one man, generally an engineer or technician, whose sole duty is to follow closely the operation of the kilns and their auxiliary equipment. As observed from the previous examples illustrating the savings that are frequently possible by reducing nuisance down time, the full-time employment of an engineering manager can, more often than not, be justified economically. He must be delegated adequate authority to make his position impressive.

In the smaller plants where possibly only one small kiln is operated, the office of engineering manager may be filled by a man who is covering a variety of assigned duties. This is not always satisfactory, since there is a diversion of attention, the



An air view of the outstanding rotary kiln lime plant of the National Gypsum Company at Kimballton, Va.

sense of appreciation for the problem may become distorted and judgment therefore impaired. Some men fill these multiple offices quite well, while others cannot do so.

In many cases it is an excellent and effective plan to have an outside specialist survey the plant and its operation for the purpose of getting unbiased opinions and recommendations for improvement. The viewpoint of such an outside observer is not hampered by traditions or misdirected authority. He is not likely to be bewildered when it comes to distinguishing between the trees and the woods. The very strangeness of the plant will throw into bold relief any irregularities or incongruities that are accepted as commonplace by those familiar with it.

Nevertheless, and regardless of the manner in which the office of engineering management is filled, management must be fully acquainted with the *what*, *why*, and *how* of nuisance down time.

What happened? Why did it happen? How can a recurrence be prevented? Only by getting the true answers to these questions can nuisance down time be reduced or even eliminated. Every possible effort must be directed toward keeping the kiln rolling — rolling — rolling. It must be turning every minute it is on the production line if the greatest possible economy of the operation is to be realized.

The Daily Log

With the main office organized and receptive, the next thing to do is to record every minute of down time and its apparent cause. This is best accomplished by keeping a rather complete daily log of the kiln plant operation. The operator must include in his log the number of minutes or hours of down time and ascribe it to some direct cause. The plant office can transpose these down time entries from the daily log to the down time record sheet which may contain entries such as these:

PLANT NO. 1 KILN NO. 3
WEEK OF 5/10 to 5/16

Date	Cause of lost time	Downtime
5/10	Tighten girth-gear bolts	10 min.
5/10	Replace coupling on kiln drive motor	1 hr. 15 min.
5/11	Tighten coupling on kiln drive motor	5 min.
5/12	Coal hung up in pulverizer feeder	15 min.
5/13	Tighten coupling on kiln drive motor	5 min.
5/16	Tighten girth-gear bolts	15 min.

Now here is a modest record of down time amounting to 2 hrs. 5 min. on No. 3 kiln for the week. Two entries refer to tightening girth-gear bolts, a total of 25 minutes. There is something the matter here. Three entries totaling 1 hr. 25 min. are devoted to the coupling on the kiln drive motor. Why does it work loose? How can this be corrected? As the record grows, it will be found that the items fall into various classifications.

Sometimes the item as reported on the daily log is misleading. This was experienced by the writer when the log carried the item "heating kiln." There were so many repetitions of this item that it comprised a major down time factor. Investigation revealed that "heating kiln" was the proper reason for not turning the kiln, but that the kiln chilled below the operating point when lumps of coal clogged the table feeders of the coal mills and some time elapsed before the burners observed the lack of fuel.

Now these burners had more to do than just keep looking into the kiln all the time, although it was seldom that they delayed their observations for longer than 15-minute intervals. The log called for an observation and entry every half-hour. So the burner couldn't be censured for this down time, nor could we expect them to be looking into the kilns all the time. The answer to this problem lay in another direction.

The coal used for fuel was a good grade of mine-run bituminous, and the coal bins over the pulverizers were filled by elevators and chutes discharging into about the center of the bin. While the bin was filling, the lump coal would roll to the outside against the bin walls, leaving the fines in the center. When the bin was emptying, the coarse coal would roll down into the pulverizer feed-pipe and invariably cause trouble by jamming on the pulverizer feeder table.

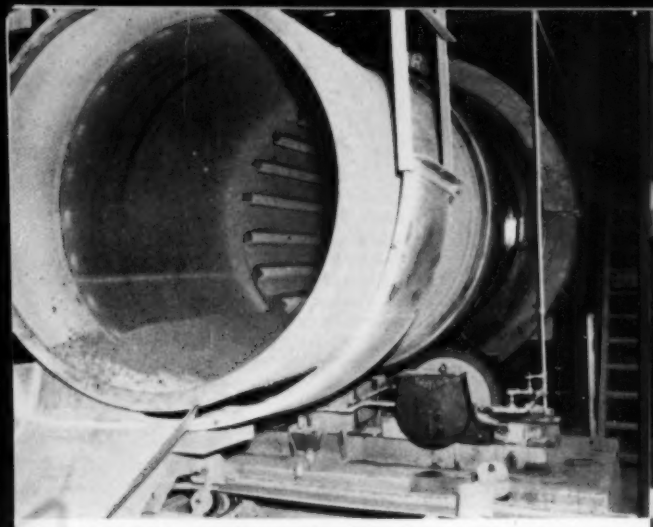
After the installation of hammer mills, which crushed the coal before it was elevated to the storage bins, the down time due to "heating kiln" practically vanished.

Summary

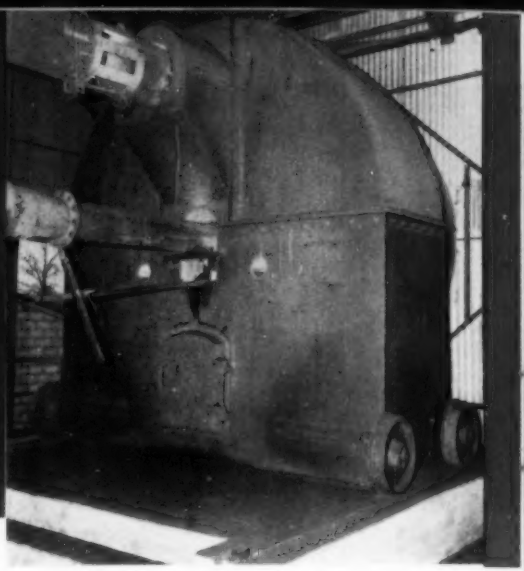
Such down time studies are invaluable for bettering the economy of any rotary kiln operation. When the workmen know that manage-

(*Continued on page* 112)

The drive of a rotary lime kiln by a 125-hp. variable-speed d.-c. motor through V-belts, a reducer, and gears.



The 6-ft. 6-in. diameter by 50-ft. long rotary dryer which receives material from the kiln at 2,000 deg. F. and discharges it at 140 to 150 deg. F.



The firing end of Buckite's new kiln. Controls are centrally located on the firing floor, so that one operator and a helper can control all three units.

View of the three rotary kilns which now comprise the burning plant of Buckite Refractories, Inc., at Woodville, Ohio. The new 8-ft. 6-in. by 160-ft. unit is at the right.

Buckite Installs

another ON THE SPOT report

ON January 1 of this year Buckite Refractories, Inc., of Woodville, O., fired up a new 8-ft. 6-in. by 160-ft. Traylor rotary kiln, thus completing the final phase of a major expansion program launched about 18 months ago. Somewhat larger than the two older units which formerly comprised the burning plant, the new kiln has increased the company's total production of dead-burned refractory dolomite, which is marketed under the trade name of "Buckite," by 60 to 65 percent.

The new kiln, which is still in its first run, was so designed as to permit the combustion gases to flow through the system as easily as possible, thus assuring maximum fuel economy, as well as eliminating the excessive heat concentrations which cause undue wear on brick linings and alloy castings. Because of the unusually high burning temperatures which characterize this operation (3,200 to 3,500 deg. F.), so many variables are encountered that a certain amount of simplicity is considered desirable. Consequently the kiln units are not as fully instrumented as some in the industry, but the company feels that it has gone as far in this respect as is practical

The new kiln is direct-fired by this pulverizer which utilizes heat from the kiln hood to dry the coal. Similar units fire the two older kilns.

Elevators discharge the finished product into overhead storage bins from which the material is delivered by gravity into covered hoppers and containers for shipment to customers.

New Rotary Kiln

BY WILLIAM M. AVERY

Output of dead-burned refractory dolomite at Woodville, Ohio, plant is increased by 125 Tons per day

at this time. On the basis of three months' operations, both fuel economy and lining performance in the new kiln promise marked improvement over previous experience. The new unit was in service for 80 days before the first ring was shot out.

Although wholly owned by the nearby Ohio Hydrate & Supply Co., Buckite is operated as a separate company, and there is an entirely separate sales organization for "Buckite" refractory materials. Fred Witmer is president and general manager of both companies, and E. J. Meyer is operating manager for Buckite. Ohio Hydrate has done all the stone processing for Buckite since the latter plant was placed in operation, in April, 1934. Originally a one-kiln operation, the second kiln was installed shortly after the plant was built. The plant was purchased by Ohio Hydrate in February, 1941, and has been operated since that time with only minor changes until the recent expansion program was undertaken.

Ohio Hydrate quarries the stone for Buckite from what is believed to be one of the best deposits in northwestern Ohio. The magnesium carbonate content of the material runs consistently 44 percent or more, and calcium carbonate averages around 55½ percent. Even the top stone in the quarry runs about 99.4 percent total carbonates, while the lower levels from which material is quarried for Buckite show close to 99.6 percent. Throughout the entire width and depth of the quarry the variation in the quality of the stone is said to be less than one-fourth of one percent.

The 400-acre deposit is an almost solid mass of stone, with very little stratification. Pockets, slips, and other faults which might cause contamination are conspicuously absent. The 70-ft. face is drilled with Loomis Clipper well drills, and a single row of holes is shot by means of delay caps to obtain maximum breakage and minimize vibration. The stone is loaded by 2½- and 4¾-cu. yd. Marion electric shovels into quarry-type rear-dump Euclid trucks which haul a pay-load of about 20 tons.

The trucks dump directly onto a Traylor apron feeder, which delivers the stone to a 60- by 84-in. Traylor primary jaw crusher with a capacity of about 500 t.p.h. The jaw receives its momentum from a driving unit consisting of a large shaft, a 16-ft. driving pulley with a 30-in. face, and a 12-ft. flywheel. Here the stone is reduced in one operation to the 5- to 9-in. size for feeding to Ohio Hydrate's battery of 36 shaft kilns.

Minus 5-in. stone from the primary crusher is fed by an inclined belt conveyor to the secondary screening plant, where it is recrushed, washed, and sized in preparation for shipment to Buckite. Here the principal items of equipment are a battery of multiple-deck Simplicity

E. J. Meyer, operating manager of the Buckite plant, has been associated with the dolomite industry since 1916.

Russell P. Meyer, superintendent of the plant, who did the engineering work in connection with the recent expansion program.

A general view of the Ohio Hydrate & Supply Company's quarry from which stone is supplied to Buckite.

Loading one of the quarry-type, rear-dump trucks at the quarry face.

vibrating screens, three double-roll crushers, and two 4-ft. Symons cones, the latter arranged in closed circuit with the screens. These facilities are used to prepare the raw stone to what company officials refer to as "Tiffany perfection"—a thoroughly washed product evenly sized between the limits of 5/32 and 13/32 of an inch. The quality and uniformity of the end product and the cost of making it are materially influenced by the care with which the raw stone is prepared. Especially desirable is a product with sharp, angular corners which will interlock and stay in place when it is shot into open-hearth and electric furnaces.

During the summer months Ohio Hydrate loads from 25 to 40 cars per day for Buckite and for the commercial trade. For the current year the plant is scheduled to produce about 175,000 tons of material for Buckite alone. Because all of this material must be washed, sufficient material is stockpiled at Buckite to carry the rotary kilns through the winter months. Side-dump railway cars are loaded at the washing plant and hauled a distance of about a mile to the stockpile area adjacent to the rotary kilns by a 45-ton diesel-electric locomotive.

The stockpile, which at the end of a normal operating season contains around 65,000 tons of sized material, is parallel to the rotary kilns and separated from them by a single-track siding. There is an undertrack hopper, as well as a short recovery tunnel which runs transverse to the stockpile. During the normal 40-hour work week enough stone is placed over the tunnel by means of locomotive cranes and bottom-dump cars to enable the plant to run about 48 hours on gravity feed. There are three hoppers above the tunnel, equipped with manually-operated gates through which the stone is fed onto an 18-in. by 45-ft. belt conveyor. Within the plant proper the conveyor inclines upward and delivers the stone to either of two bucket elevators, which discharge into over-head steel bins of about 100 tons' capacity each.

Feed to the new kiln is controlled by means of a Type FC22 Syntron vibrating feeder. This unit delivers the stone to a bucket elevator from which the actual feeding is done. A smaller, Type FMC Syntron also introduces the desired amount of mill scale or iron ore at this point, the two feeders discharging at right angles to each other into the boot of the same elevator.

Left: This 60- by 84-in. primary jaw crusher reduces quarry stone in one operation to the size suitable for Ohio Hydrate's shaft kilns.

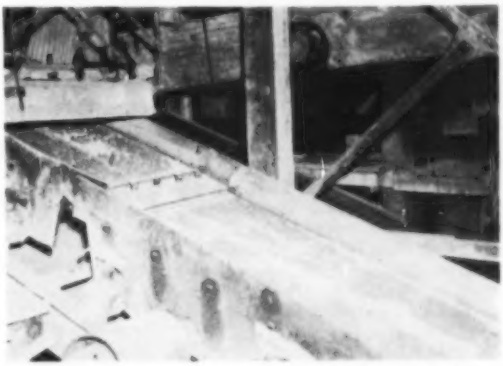
Right: One of the two 4-ft. cone crushers which reduce the stone to the evenly-sized material required at Buckite.

The new Traylor kiln has an all-welded shell measuring 8-ft. 6-in. in diameter by 160-ft. in length. It is a very heavy-duty unit, the shell being 1-in. thick at the firing end to withstand the extremely high temperatures required to produce the desired end product. The kiln is supported on two piers by as many sets of oil- and water-cooled trunnions. It has a pitch of ½-in. per ft. and is lined with five different grades of firebrick to withstand the temperature at various locations throughout its length. In the hot zone, where the temperature may go as high as 3,500 deg. F., the lining consists of 6-in. magnesite brick.

In this type of service linings last from 2 to 6 months, depending largely on the alertness of supervisors. Since the refractory lining material almost invariably spalls when a kiln is shut down, the life of a lining is in a large measure dependent on the continuity of the opeartion. Even two shutdowns may result in such severe injury that the lining must be replaced.

The kiln is driven through a Falk Model 11DA speed reducer and a conventional gear and pinion set by a 40-hp. variable-speed Westinghouse motor. The range of speeds is from about one r.p.m. to one revolution in 4 minutes, but in practice the kiln is driven at about one revolution in 2 1/6 minutes. The stand-by drive for use in the event of a power failure is a 1949 Willys "Jeep" gasoline engine, which has sufficient power to turn the kiln about 1 revolution in 5 minutes. The kiln drive and the feeders are regulated independently.

The new kiln is direct fired with a Babcock & Wilson Type E-26 pulverizer, which utilizes heat from the kiln hood to dry the coal. This unit delivers coal of uniform fineness and at closely controlled rates. It is controled from the burner floor. The plant is equipped to operate on coal of any size up to mine run. Large coal is elevated into a bin over a Jeffrey Flextooth crusher which reduces it to minus ¾-in. for feeding to the pulverizers. Incoming coal is handled by means of an undertrack hopper, a bucket elevator, and an enclosed overhead conveyor which discharges through



The stone is thoroughly washed and sized on vibrating screens to what company officials refer to as "Tiffany perfection."

A view in the recovery tunnel under the raw stockpile at the Buckite plant. The kilns can be operated for about 48 hours on gravity feed through this system.

Robert J. Taulker, assistant superintendent of the Buckite plant, and Franklin Witmer, Ohio Hydrate's sales manager.

chutes into bins supplying the pulverizers. The two older kilns, which are 8-ft. by 6-in. by 150-ft. and 8-ft. by 125-ft., are also fired with B&W Type E pulverizers, the larger using an E26 and the smaller an E24.

Hot gases from the new kiln pass from the feed end into a 14-ft. diameter dust chamber, which is about 25-ft. high from the bottom of the cone to the top. This is entirely lined with firebrick to withstand the high temperatures—around 1,100 deg. F. From the dust chamber the gases pass through a breaching into a double-walled brick chimney which supplies the natural draft. The draft is controlled from the burner floors by louvres located between the stack and the dust chamber.

The kiln discharges into a 6-ft. 6-in. by 50-ft. Traylor rotary cooler which receives material at 2,000 deg. F. and discharges it at 140 to 150 deg. F. Nineteen "Z" bars welded to the inner shell of the cooler pick up the material and drop it in a continuous stream to facilitate cooling. The cooler discharges through a perforated plate at the low end onto a Jeffrey belt conveyor. The small amount of plus ⅝-in. material (consisting of clinkered fines from the kiln) which fails to pass through the perforations is collected in a wheelbarrow and periodically recrushed in a Universal No. 3 jaw crusher. This material is then elevated and discharged on the same belt conveyor which handles the main flow.

The finished product of all three kilns is identical in size and quality, the new unit, however, producing at a somewhat higher rate due in the main to its greater size. Elevators discharge the product, without any further processing, into three storage bins which have a total capacity of approximately 700 tons. From these bins the material is delivered by gravity into covered hoppers and containers for shipment. The plant is served by the Pennsylvania Railroad. All sales of the material are for refractory bottom lining in open-hearth and electric furnaces.

Except for welding together the three sections of the new kiln (this was done by Traylor), all work in connection with installing the new facilities was handled by regular employees of Buckite. The work was used as a fill-in during the steel strikes last year, but aside from this it was carried out without interrupting operations. The layout of the new equipment was made by Russell P. Meyer, who is superintendent of the plant. Robert J. Taulker is assistant superintendent.

Stone and mill scale (or iron ore) are delivered to the kilns by means of vibrating feeders.

Officials of Buckite Refractories, Inc., are Fred Witmer, president and general manager; E. J. Nieman, vice-president; E. H. Mauntler, secretary; T. E. Snyder, treasurer; H. H. Meyer, sales manager; and E. J. Meyer, operating manager.

Nuisance Down Time

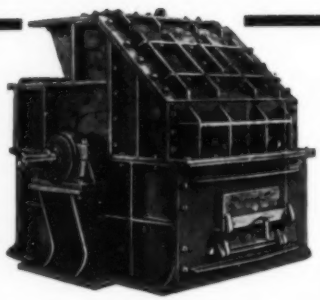
(*From page* 107)

ment is taking down time periods seriously, they, too, become interested. Frequently the kiln operator or the master mechanic or the foreman or the plant superintendent, or even a laborer will offer suggestions for overcoming some difficulty. These must be given every consideration. They need not, must not, be accepted and applied blindly; neither must they be ignored. But when these men learn that their offerings are given every consideration, and an explanation is made as to why they may not be available, they appreciate it immensely. Then they are encouraged to offer others. Many an economical engineering suggestion has thus been contributed to the cause of better rotary kiln plant operation.

The daily log, and the plant down time record can be made to give the answer to "*What happened?* "*Why did it happen?*" generally can be answered by making an investigation. "*How can a recurrence be prevented?*" will have its answer in competent engineering.

For Better Agstone Sizing . . .

AMERICAN CENTER FEED HAMMERMILLS



To obtain faster reduction, plus higher efficiency in reducing to agstone size, American ACS Hammermills have a *special center* feed.

The hopper opening is centered over the rotor, subjecting the stone to longer travel in the hammer circle and greater frequency of impact—assuring a higher ratio of fines.

The *BALANCED AMERICAN ROTOR* is factory equipped with the type of hammer (for medium, heavy or fine reduction) and the number of hammer rows to fit your specific sizing operation.

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Originators and Manufacturers of Ring Crushers and Pulverizers

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New Crushing Plant Cuts Costs For National Gypsum at York*

NATIONAL Gypsum Company recently completed a major construction program at its York, Pa., plant. Major target for the improvement program was the erection of a new crushing, screening, and sorting plant which formerly had been the bottleneck to overall efficient operation. With the new unit in operation, the cost of reducing stone down to kiln feed or hammermill size has dropped approximately 50 percent; and at the same time the capacity of the plant was increased to 125 t.p.h.

The plant is located about two miles west of the center of the town of York. The original plant was built in 1905 and was later bought by Lowell Palmer, who added to the original facilities one of the earliest of commercial lime hydrating plants. Palmer sold the plant to Universal Gypsum & Lime, from whom National Gypsum bought it in 1935. At this plant are two 24- by 86-ft. gas-fired vertical kilns, said to be the largest in the country, which were built in 1912.

Most of the feed stone for the plant comes from three nearby quarries. In addition, there is an underground room-and-pillar mine which was opened when the stone in one of the older quarries became too difficult to recover by open pit mining methods. This mine is still worked during periods of bad weather.

There are two distinct types of limestone in these deposits, white and blue-gray, making it desirable to sort the stone. The blue stone is kiln stone; the white stone is sold in its pulverized state.

In the quarries the stone is loaded out with two shovels, one Lima 1½-cu. yd. and one Thew Lorain 1¼-cu. yd. It is hauled to the crushing plant in 17-ton capacity rear-dump Euclid trucks. Here it is discharged over a Link-Belt 60-in. heavy-duty inclined steel apron feeder. The feeder forms the bottom of the dump hopper and assures uniform feed into the Pennsylvania 30- by 60-in. single-roll primary crusher.

The operation of the feeder conveyor is under convenient control of an operator who is stationed at the dump hopper to watch this part of the operation. It travels at the rate of approximately 10 f.p.m. The conveyor is shut down before another load is dumped, and a bed of stone is left to cushion the impact.

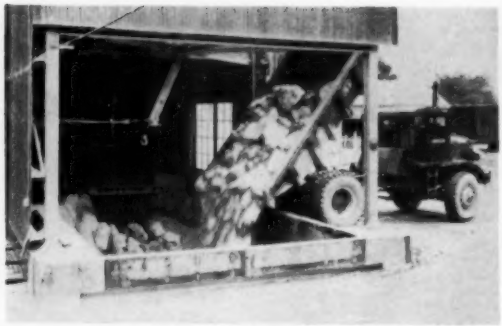
A large-diameter differential backstop of band-brake type is mounted on the head shaft to prevent backward motion of the loaded conveyor when the power is shut off.

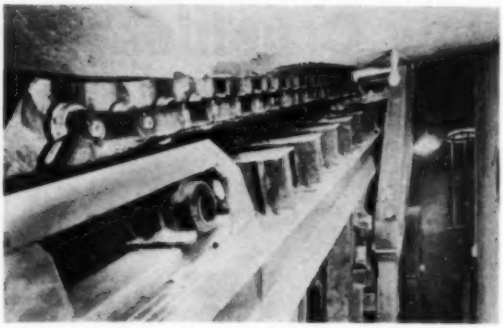
Crusher discharge falls onto an inclined reciprocating plate feeder which delivers the product to the boot of a Link-Belt bucket elevator. This elevator is steel encased and has vertical centers of 112 ft. Another differential backstop on the elevator head shaft prevents backward motion at this point when the power is shut off. Material is discharged over a 5- by 10-ft. double-deck vibrating screen, where three separations are made. The fines are carried by a Link-Belt screw conveyor to a disposal bin located outside the building; material retained on the second deck is divided and sent to two parallel spalls storage bins; and the oversize is delivered to a Link-Belt 8-in. wide, flat-top, heavy-duty steel apron-type picking-table conveyor, 28 ft. long, operating at 30 f.p.m. Several men standing alongside the table separate the white and blue stone, dropping each into their respective bin chutes. The white stone is sold for a variety of purposes: for marking baseball diamonds, to make phonograph records,

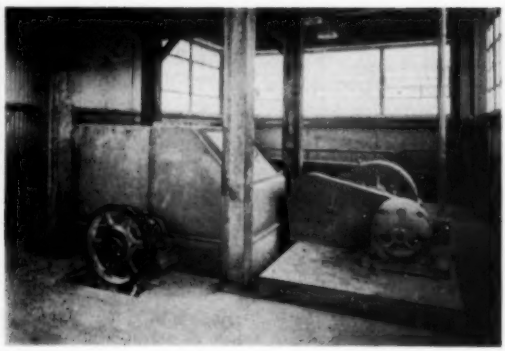
(*Continued on page* 125)

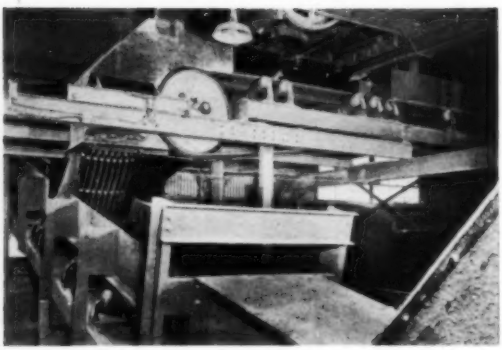
*Abstracted from an article appearing in the February, 1950, issue of *Link-Belt News*.

• A general view of the National Gypsum Company's lime plant at York, Pa. The tall building in the foreground is the new rock crushing, screening and sorting plant.









• Top, left: A load of limestone being dumped into the receiving hopper, which often takes rocks weighing 1½ tons.

• Top, right: A view in the pit below the hopper, showing the construction of the apron feeder-conveyor chain and feeder sides. This inclined conveyor feeds the stone into the primary crusher. In the foreground is one of the take-up bearings supporting the conveyor foot shaft.

• Center, left: The flat-top steel apron-type picking table conveyor, 48 in. wide, on which blue and white stone is sorted. The conveyor receives the stone from the top deck of a double-deck vibrating screen.

• Center, right: The inclined 36-in. wide, 78-ft. long roller-bearing belt conveyor, which extends from the stone bin reclaiming belt conveyors to the secondary crusher or the pulverizer in the mill building. The pulverizer discharges to either of two centrifugal discharge bucket elevators shown in the background.

• Bottom, left: The head end of the 112-ft. centers vertical steel-encased super-capacity bucket elevator, showing the individual 40-hp. motor drive. The drive includes enclosed herringbone-gear and roller chain drives. In the left foreground is the differential backstop which prevents backward motion of the loaded elevator when power is interrupted.

• Bottom, right: At the top of this illustration is one of the two 36-in. roller-bearing belt conveyors used for reclaiming sorted stone from the bottom of two parallel rows of storage bins. Both conveyors deliver to the inclined 36-in. belt conveyor at the left. Note the closed-end welded steel conveyor pulley, and the series of shock-absorbing rubber tread troughing idlers at the point where one of the short-centers apron feeders delivers stone to the conveyor belt. In the right foreground is the chute from the other reclaiming conveyor.

Kiln Draft Control

By LEONARD HOLMAN

DRAFT gauges are misnomers inasmuch as they do not gauge draft. Draft is a current of air or gas, and the draft gauge does not measure or indicate the flow of air or gas but simply measures the vacuum, or negative pressure that can cause a flow of air or gas.

The draft gauges commonly used on kilns have a range usually from 0 to 10 in. water. An inch of water is equivalent to .073554 inches of mercury, .57818 oz. p.s.i. or .036136 lbs. p.s.i., so with 10 in. water draft showing on the gauge, we have a vacuum or negative pressure of .36136 or roughly 1/3 of a pound p.s.i. of pressure difference which may cause a flow of air or gas.

The amount of gas that any given pressure can cause to flow is determined by the area through which this flow takes place and the resistance to flow through this area. If the resistance is doubled, the amount of flow will be halved; if the area is halved the flow will decrease to one-fourth, all with the same pressure differential. The area and resistance to flow in a kiln never remains constant, but varies constantly from draw to draw, so one can not expect to maintain a correct air-fuel ratio by just controlling the kiln top pressure differential constant with the fuel input.

A vertical kiln is filled with loose stone. The voids between the stone form the gas passages. The cross section area of these voids is the area through which the gas flows. As the kiln is drawn and the lime falls easily or heavily as the case may be, the lime is compacted more or less, thus changing the area. The size of the stone also varies, thus changing the resulting void area. The resistance changes as the kiln is filled and emptied and as the gas flow varies.

Resistance varies as the square of the gas mass velocity. The velocity increases as the area decreases or as the gas volume increases. In periodic draw kilns, the carbon dioxide from the stone makes up about 1/5 of the kiln gas. This portion of the kiln gas varies as the kiln is drawn, being greater just after a draw and much less just before the draw. If the draft is controlled at a point where it will give perfect combustion at a time half way between draws, it will provide excess air just before the draw and insufficient air just after the draw.

The following case is a very common occurrence in all vertical kilns. The kiln is operating well at a definite draft reading. It is drawn and hangs hard, and after a bit of extra trimming it falls heavily. Much of the lime has been broken up and the heavy fall compacts these small soft pieces more than usual. After the kiln is closed up and firing is continued, it is noticed that with the same damper setting as before the draw, the draft has increased several points; also, the stack shows smoke. If the draft reading is reduced to the prescribed point, much incomplete combustion and smoke will result. The gas passage area has been decreased through compacting the charge and closing the voids, and the volume of gas has increased due to the greater evolution of CO_2. To correct the situation one must increase the draft several points so that the increased pressure can force the gas through the smaller area.

Recirculation of hot zone gas also increases resistance and needed pressure differential. Suppose a kiln which on normal operation has 135 lbs. per minute of products of combustion and 40 lbs. per minute CO_2 from dissociation of limestone for a total kiln gas of 175 lbs. per minute. Draft conditions might be as follows: top—5 in. water; upper part of calcining zone or point where hot gas for recirculation is withdrawn, 4 in. water; combustion zone or point where recirculated gas is returned, 2 in. water; top of cooler 1 in. water. With these conditions there is a pressure drop through the calcining zone of 2 in. Now suppose we recirculate 75 lbs. gas per minute, increasing the flow through the calcining zone from 175 lbs. per minute to 250 lbs. per minute. Resistance and pressure drop vary as the square of the mass velocity; so the new resistance or pressure drop through the calcining zone with 75 lbs. recirculation will be in excess of 4 in. The new draft conditions of the kiln to maintain the same fuel air ratio would then be as follows: top, 7 in.; upper part of calcining zone, 6 in.; lower part of calcining zone, 2 in.; top of cooler, 1 in. as before. This is shown as curve B in figure 1. Thus when a kiln uses recirculation, it is virtually impossible to control the fuel-air ratio with the top pressure and at the same time make changes or adjustments to the flow of recirculated gas. In this case one must of necessity, control fuel-air ratio by a draft or pressure reading taken from a point below the area

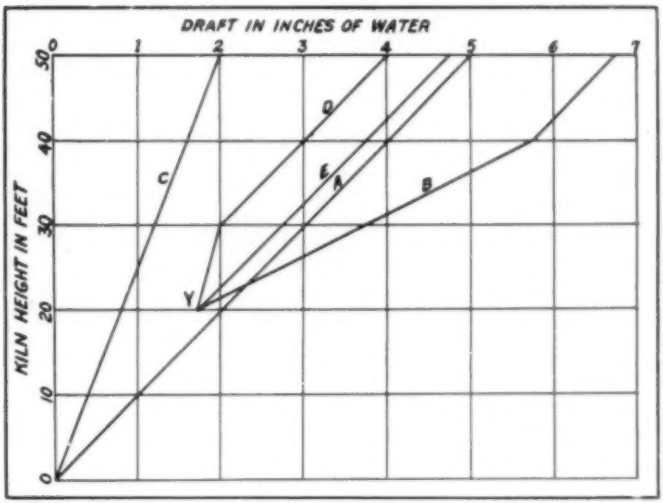


Figure 1. A—constant pressure drop through constant resistance at 1 in. per 10 ft.; E—typical pressure drop for normal vertical kiln; B—typical for E with 40 percent hot zone recirculation; C—pressure drop for E at 2/3 production rate; D—pressure drop indicating hole in calcining zone due to hang. For a kiln of constant cross section area the pressure drop rate would increase at the zone of CO_2 dissociation. In practice this is offset by the increased area at the preheating zone.

affected by the recirculation.

When gas flows through a cylinder such as a vertical kiln and the cylinder has a constant resistance throughout its length, such as the theoretical packing of stone in a vertical kiln, the pressure drop will be a straight line as shown in figure 1, curve A. For a normal operating kiln the pressure drop line will have a slight change of direction at the point of fuel combustion, as shown at Y. This is due to the weight of the fuel being added to the combustion air. For this normal kiln draft curve, I have taken a pressure drop of 1 in. water per 10 ft. of kiln height for the products of combustion, and have supposed 14 lbs. of air per pound of fuel. The pressure drop through for the 14 lbs. of air alone would be

$$1 \times \frac{14^2}{15^2} = .87$$ for a total of 1.74

pressure drop for the 20 ft. below the combustion zone. This is shown on curve E, figure 1. My work has been of such a nature that I have had many opportunities to verify this information given in figure 1 by taking draft readings at different levels (as many as the poke holds and inspection holes in the kilns would allow) and then plotting these readings against the height at which the reading was taken. Data was taken on kilns from 5 to 24 ft. in diameter and from 15 to 60 ft. in height. I found that as long as flow and area were constant, the pressure drop line was straight. When the pressure drop line deviated, it was because of changes in shaft area, packing of stone, large voids due to the kiln being hung, infiltration of air, or recirculation. This knowledge was of great help to me, and can be to you in trouble-shooting kilns by draft readings.

I have referred only to vertical kilns, but the above also holds true for rotary kilns, lime or cement, and has more practicable application to rotary kilns with chain sections, which can have a great change in resistance due to congestion in the chain section. The pressure at the hood is what determines the amount of combustion air entering the kiln, not the pressure at the dust chamber. As rings build up or congestion occurs in the chain section, the dust chamber draft increases, while the combustion air input decreases, all with the same damper setting; and if a constant supply of fuel is fed to the kiln, incomplete combustion will result. If the burner has orders to maintain a certain dust chamber draft, combustion will suffer more because he will close his stack damper somewhat to bring the dust chamber draft down to the prescribed point, thus decreasing still more the combustion air input.

Figure 2 represents the pressure drop through a 400-ft. rotary kiln with a 50-ft. chain section. Suppose 1 in. water pressure differential is required to move a given mass of gas through the 350-ft. open section with 100 percent of the area effective. This pressure drop is shown as line A. Line A is extended to the O point to show that the total pressure would be 1.143 in. water if there were no chain section.

If the 50-ft. chain section had but 20 percent of its area open, the pressure drop through this 50 feet would be 3.57 in. of water, as shown by line B, for a total pressure drop of 4.57.

If we know that the pressure drop through the un-chained section is 1 in. water, and we have a dust chamber draft of 2 in. water, it is easily calculated that 38 percent of the chain section is open and 68 percent of the area is closed to gas flow. This pressure drop line is shown as C.

Correct placement of draft gauges or a different means of controlling air-fuel ratio will help to correct the above-mentioned faults. A draft gauge indicates the pressure in the kiln in relation to atmospheric pressure. Actually we are not interested in this pressure differential. What we want to know is how much combustion air is flowing into the kiln. We want a gas-flow gauge—a volume gauge rather than a pressure gauge.

Most gauges are connected to the kiln top and indicate the negative pressure at that point. Actually this is about the worst place on the kiln for the reading to be taken. The pressure here, at the top, has the entire kiln change affecting it, and is most apt to be erroneous when indicating inflow of combustion air.

In using the ordinary draft gauge one must eliminate all of the variables possible in order to get a true indication of air inflow. Thus, following this line of reasoning, we should place the gauge at the point where the air enters the kiln. At this point the pressure differential is so small, however, that an ordinary gauge can not indicate it. Also in many kilns, the air enters through several burner ports, and it is not wise to use one condition to control the rest. However, this practice is better than controlling by top draft.

Draft gauges connected to the kiln at different heights can tell much of what is taking place in the kiln and the condition of the charge. For example, let us picture a kiln having four draft connections—one at the air inlet as mentioned above, one at the kiln top, one at the combustion zone and one half way between the combustion zone and the top. Let us suppose that in normal operation the gauges read from bottom to top 1-2-4 and 6 in. water, this with a definite fuel input giving good combustion. Refer to Figure 1. Now as long as the lower gauge is kept at 1 and the fuel input is maintained steady, the fuel-air ration will be steady. The top draft may vary from 4 to 8 or even more to keep the bottom draft at 1 in. water, thus indicating change in the resistance to and area of flow, and or change in CO_2 evolution. Suppose the gauge at the 30 ft. level should drop to about 2 in., indicating less resistance to flow between this gauge and the one at the combustion zone. This would indicate a hole due to a hang in the calcining zone. This draft condition is shown by curve D in figure 1.

The center burner kiln is easily controlled if the draft gauge connection is made at the air inlet in a manner similar to the following. All combustion air enters the kiln

(*Continued on page 125*)

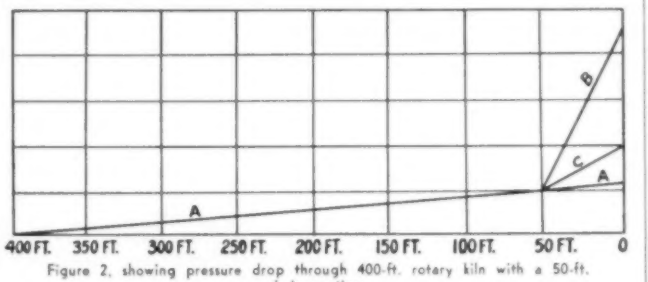


Figure 2, showing pressure drop through 400-ft. rotary kiln with a 50-ft. chain section.

$100,000 Investment In Oregon Agstone

By HARRY F. UTLEY

THOUSANDS of acres of lime-deficient but otherwise highly fertile soils in agricultural western Oregon have this year been provided with a dependable, convenient source of agstone.

The new $100,000 plant of the Roseburg Lime Products Company, located 12 miles southeast of Roseburg, Ore., began full-scale operations on May 1, 1949, and delivery trucks have since been carrying capacity loads of the finished product to lime-starved acres within a 150-mile radius of the plant.

The company, headed by Harry Brubaker, has leases on five outcrops of high-calcium limestone near the new plant. Associated with Mr. Brubaker in the new venture are Clyde Fullerton, M. E. Groshong, and Bert Gilbert. Capacity of the new plant is in the neighborhood of 40 t.p.h. of the finely-ground product, all of which passes 50-mesh, with a minimum of 40 percent through 50-mesh and 20 percent through a 100-mesh screen. This, according to Mr. Brubaker, exceeds A.A.A. and Oregon Agricultural Department requirements.

Quarrying of the stone and its delivery to the plant is done on a contract basis by Loran O'Neil of Roseburg. A Byers Jr. ½-cu. yd. shovel loads the stone into dump trucks which ascend a ramp and discharge to a hopper. Maximum size of the chunks is about 20 in.

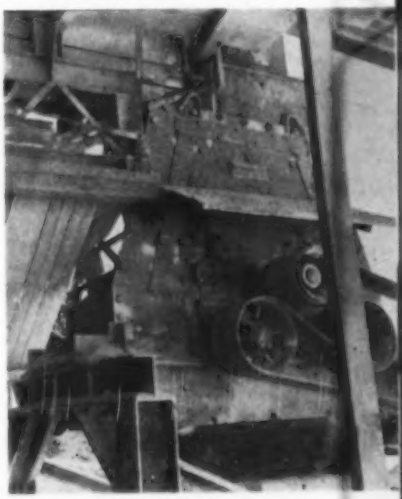
A New Holland 30FB feeder puts the quarried stone directly into the 30-in. feed opening of the all-purpose reduction machine, a New Holland 3030 double-impeller breaker. This unit is the "heart" of the plant and does the entire crushing and grinding job. Each impeller has three striker bars and weighs over two tons.

The impellers rotate in opposite directions at a speed, in this instance, of about 850 r.p.m. Fineness of product is controlled both by impeller speed and by adjustment of the setting of the fixed breaker bars. The machine is direct-driven through flat belting by a Buda 180-hp. diesel engine which is also connected directly to a 25 kw. generator which supplies current to power the conveyor and screen motors.

The product of the impact breaker discharges to a 30-in. by 55-ft. inclined belt conveyor which runs up to a Symons 4- by 8-ft. inclosed vibrating screen, where the plus No. 10 particles are rejected and returned by a 24-in. by 45-ft. conveyor to the New Holland machine for further reduction.

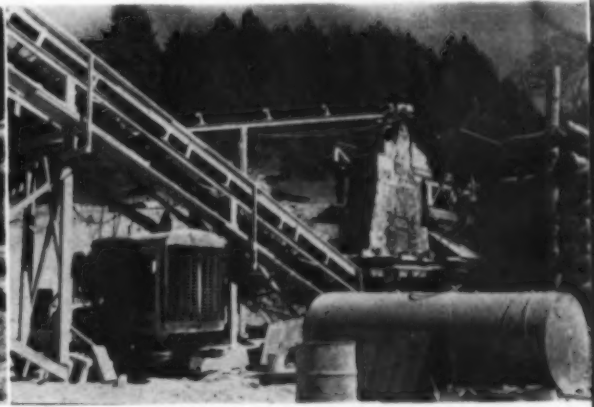
Screen throughs are finished agricultural limestone and are chuted to a 20-ton truck-loading bin directly below. When this bin is nearly full, a side gate opens to divert the surplus to a 24-in. by 80-ft. stacker belt which builds up an open-storage pile through a swinging spout. Loading to delivery trucks from the pile is done by a Hough "Payloader" mounted on a Case tractor.

Delivery of the material is done, for the most part, by the firm of Hicks & Yount, Roseburg, whose fleet of 8-ton trucks includes three Baughman bodies which spread the agstone directly on the land.



• The double-impeller breaker, which does the complete crushing and grinding job, producing a maximum size of 10-mesh material.

• The Roseburg Lime Products Company's operation near Roseburg, Ore. Crushed material is screened, the oversize being returned to the breaker on a belt conveyor.



• Another view, showing the 180-hp. diesel engine which drives the double-impeller breaker (right background) and the feeder.

Systematic Chemical, Trace Element Study of a Producing Agstone Quarry

By W. D. KELLER
Professor of Geology
University of Missouri

SOME agricultural limestones when added to soil produce a stronger plant response than do other limestones which test the same in calcium carbonate equivalent. That is a hard practical fact, supported by evidence known to farmers, county agents, soils men, and the agricultural limestone industry. It has been a disturbing fact to explain in some cases, and especially so when the man to do the explaining is on the losing end of the case. However, the second limestone may evoke a better plant response than the first under a different agricultural situation. Hence, it is not always correct to say from a single observation that agricultural limestone from one quarry is universally superior to another.

It is correct, however, that agricultural limestones possess rugged individualities; and furthermore, we know that different layers of limestone within the same quarry may be decidedly different from the others. This difference does not mean simply richer in chert (flint), silica sand, or hardness, but instead a deeper fundamental difference in chemical, mineralogical, and trace element content.

It now appears that the differences in plant response from several agricultural limestones are tied up with differences in their compositions. It is also possible that the stone produced from different levels or benches in a single quarry may vary enough in composition so that different lots of production may give different results when applied to the same soil type.

With the rapid advances in soil testing, as now being practiced by county agents, the specific needs of the soils in many localities are becoming known. Deficiencies in magnesium, cobalt, boron, manganese, copper, zinc, and other elements are being discovered. As a consequence the agricultural limestone industry and individual quarry operators need to find out exactly the composition of the stone that is being produced, or what can be produced by modifying the operation, or where stone is located which will supply what the demand calls for.

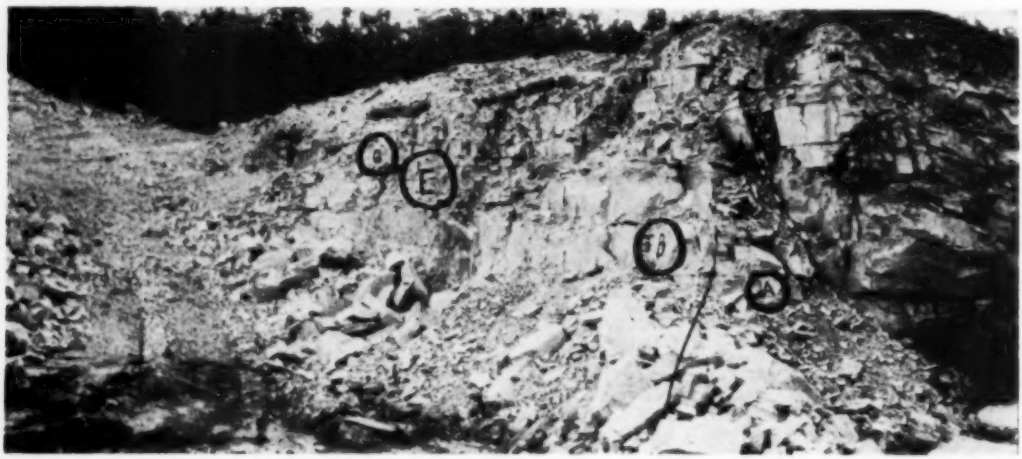
Technical Helps

The everyday experience of the average quarry operator does not include practice in systematic sampling and testing of his quarry.

To help him do such a job, or to enable him to understand and use in a practical way the information supplied him in case he hires a geologist to do the work for him, this article has been prepared. It will go through in detail the steps which were taken to sample and test systematically a small-to-medium-sized producing limestone quarry in Missouri, so as to serve as a pattern that may be duplicated.

The quarry which will be described is one operated by the M.F.A. (Missouri Farmers Association) near Marshfield, Mo., about 25 miles northeast of Springfield. The face exposed is about 30 feet high, the rock is typical south Missouri limestone (dolomite), and the quarry has been operated under average methods. Hence, it is representative of many other quarries of similar (average) size and operation; it serves as an excellent guinea pig.

This quarry was chosen for testing in connection with another agricultural and geological research project under Professor Arnold W. Klemme, extension professor of soils, University of Missouri. The viewpoint of soils was therefore retained while studying the quarry. Permission to visit the quarry, and to publish the study was graciously given by Dr. Herman Haag, manager of the plant foods division of M.F.A. The field examination was made in September, 1949, and the laboratory work was done shortly thereafter.



• A photograph of the M.F.A. quarry near Marshfield, Mo. Note the letters painted on the layers of limestone. Circles were drawn around the letters on the photographic print to aid in pointing them out. They are shown as actually painted, and are therefore as tall as the thickness of the various layers. The remainder of the letters were not visible from the point where the photograph was taken.

Marking Layers in the Quarry Face

Complete and thorough sampling of a quarry face requires that every layer, thick and thin, be studied and that specimens be taken from it. Where the layers are very similar in appearance, they may be grouped together for the more costly kinds of analyses; but, to be on the safe side, each layer should be analyzed separately in at least one way. What constitutes high similarity in appearance is largely a matter of geological experience and can hardly be defined. It is brought out in part in the following example.

To set up a practical means by which the results of the field examination and the laboratory analyses could be tied into the operation of the quarry, the layers of the quarry were first identified and marked by painting with letters of the alphabet. Any other numbers or symbols could have done qually well, but it was chosen in this study to start at the bottom layer exposed and paint a large "A" on it, through the entire thickness of the layer. Places within the quarry were selected for painting which would not be disturbed in near-future operations so that a long-lasting record of the layers would be maintained. Then if the laboratory results on layer "A" showed it to be especialy significant, either favorably or unfavorably, there would be no question of their correlation with the field location, and the quarry foreman could handle the layer accordingly. The writer has seen the results of many analyses wasted because they would not be correlated accurately with exactly what they represented in the field. To eliminate such a loss it is strongly recommended that the scheme of identification described be followed.

Description of the Layers

A detailed description of the layers in the M.F.A. quarry will be given to aid in understanding later facts of this report. Perhaps a quarry operator who knows his own property as thoroughly as he does his own name will not want to take the time, nor will he need to describe each of the layers singly. Whether or not he does it is up to each individual, but the writer has learned through field experience that enough is usually learned about each layer to justify describing them.

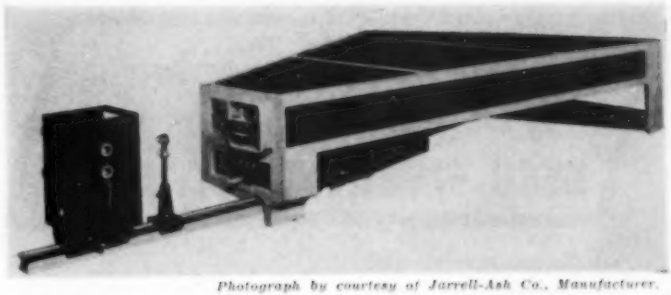
Dolomite in the quarry was recognized and determined by using the dilute hydrochloric acid test known to many operators and described in this magazine previously.*

The descriptions of the individual layers in the M.F.A. quarry range from "A" at the base to "J" at the top, as follows:

DESCRIPTION OF PROPOSED BEDS

Layer		Thickness
J	Tan to brownish, weathered coarsely crystalline, cherty dolomite. Irregular upper surface due to weathering	18 in. ±
I	Tan, slightly oxidized, coarse dolomite, irregularly laminated.	36 in. ±
H	Fine-grained, grayish "cotton rock."	15 in.
G	Similar to H (above) from which it is separated by a thin parting.	15 in.

Pit and Quarry, August, 1949. A solution of 1 part water and 1 part concentrated hydrochloric acid is dropped on the rock. High-calcium limestone fizzes in the solid, dolomite fizzes when powdered, flint or silica sand never fizz.



Photograph by courtesy of Jarrell-Ash Co., Manufacturer.

• A spectograph like the one used to analyze the limestone for trace elements. Overall length of the instrument is about 12 ft.

DESCRIPTION OF PROPOSED BEDS

Layer		Thickness
F	Thinly laminated, medium-gray, earthy dolomite. Brownish oxidized upper part.	9 in.
E	Prominent, thick, massive layer of fine-grained dolomite with fucoidal upper surface. Slightly mottled, but having an overall slight bluish cast. The "blue layer" of quarry men.	36 in.
D	Earthy, tan-gray, fine-grained dolomite. Upper part is thinly laminated.	6 in.
C	Massive, gray, fine-grained dolomite. "Cotton rock" variety, slightly more lustrous and compact than the most typical.	40 in.
B	Similar to C, separated from from it by a thin parting.	28 in.
A	Bed similar to B and C. The same kind of rock is reported by quarry foreman to continue 10-12 feet lower to quarry floor, now covered by broken stone.	10 ft.
	Quarry Floor	

Sampling for Chemical Analysis

Each layer was sampled systematically by breaking tiny thin chips (about one-half to one inch square) off the fresh, clean surface across the entire thickness of each layer. An almost continuous strip of chips was thus taken across each layer, thereby thoroughly sampling it. The chips from each layer were put together in a separate paper sack labeled Layer A, B, C, etc., and instructions were sent to the chemical laboratory

It was decided to have calcium carbonate equivalent and percent acid insoluble residue tests run on each sample. That information would show which layers were furnishing high-test rock, and which were carrying the clay and silica causing wear to crusher machinery and running the test down.

The analysis for magnesium is more time-consuming to the chemist and therefore costly. In order to economize on analytical expense, certain of the similar layers were

• An enlarged part of a spectogram from a limestone which was analyzed for trace elements. The lines signify by their location and intensity the presence and relative amounts of the elements present. A trained observer interprets them as they are shown assigned to magnesium, manganese, lead, iron, and tin. The Mg lines mean much magnesium (the limestone was a dolomite), whereas the faint tin (Sn) line barely indicates the presence of tin in tiniest trace amounts. The number 2801.1 A. refers to light having a wave length of 2801.1, Angstron units which recorded that Mn line on the film. One Angstron unit has a length slightly less than four-billionths of an inch!

grouped together for magnesium analysis: A, B, and C in one group and G and H in a second. Furthermore, because layers D, F, and J appeared from close examination in the field to be clayey, earthy, flinty, and impure, they were omitted from the magnesium analysis. The latter step was shown to be justified by the results of the acid-insoluble impurity analysis, which indicated high quantities of impurity in layers D, F, and J.

Meaning of Chemical Analyses

The results of the chemical analyses are shown in Table 2. Before concentrating on the results of each layer we want to consider the meaning attached to each type of analysis.

Column headings "Percent acid insoluble" and "Percent $MgCO_3$" are self-explanatory. They are determined directly by the chemist.

The "Percent $CaCO_3$" was calculated by subtracting from 100 percent, the sum of the percents $MgCO_3$ and acid insoluble. This gives a value for actual calcium carbonate. The actual calcium carbonate differs from the calcium carbonate equivalent ($CaCO_3$ equivalent) which is only a measure of the acid-neutralizing power of a limestone. Actually the $CaCO_3$ equivalent does not tell very much about the composition of a stone if it is dolomitic.

This last point is important and should be understood by producers of limestone. When a report on a sample of limestone comes back from a chemist saying it tested 90 percent $CaCO_3$ equivalent, that means only that it neutralized 90 percent of the acid which would have been neutralized by a sample of chemically pure calcium carbonate of equal weight. Because $MgCO_3$ has a larger neutralizing capacity weight for weight than does $CaCO_3$, a dolomite utterly unlike a limestone may give the same $CaCO_3$ equivalent test.

The latter statement is illustrated in the Table 1, where three hypothetical limestones, each giving a 90 percent $CaCO_3$ equivalent test, are listed. Note how widely the contents of actual $CaCO_3$ and $MgCO_3$ vary, although the $CaCO_3$ equivalent of the three stones is the same. These are only a few of the innumerable possibilities.

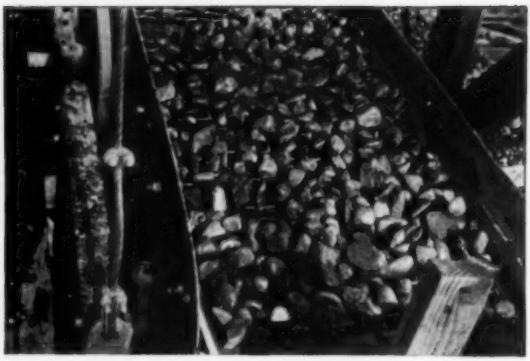
Table 1

Three Hypothetical Limestones Each Testing 90% $CaCO_3$ Equivalent

	(1)	(2)	(3)
Acid insol. imp.	10%	17%	12%
Actual $CaCO_3$	90%	46%	76%
Actual $MgCO_3$		37%	12%

"Trouble-free screening is a habit with these SECO VIBRATING SCREENS"

says Sherman B. Saunders of
W. F. Saunders & Son, Nedrow, N. Y.



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From the variations shown above, it is no wonder that different stones like Nos. (1), (2), and (3) would give different plant responses. To use an extreme illustration, a can of soda lye will show a large $CaCO_3$ acid-neutralizing equivalent although there is no calcium present in it.

Let's not get the impression that all $CaCO_3$ equivalent analyses are meaningless or bad just because they do not convey all the information that is desired. That type of analysis is very useful for drawing comparisons between limestones whose general Ca/Mg ratios are known. It takes on added meaning if the acid insoluble quantity is also reported. But for a full understanding, and for the initial testing of the composition of an agricultural limestone, an analysis must be made for magnesium and calcium carbonates. Currently, research is being conducted to devise quick and low-cost analytical methods for determing Ca and Mg in limestone.

Results of Analysis on M.F.A. Quarry Layers

Let us return to a re-examination of Table 2, where actual $CaCO_3$, $MgCO_3$, and $CaCO_3$ equivalent values are shown.

Table 2

Layer	Percent Acid Insol.	Percent $MgCO_3$	Percent $CaCO_3$	Percent $CaCO_3$ Equiv.
J	34.49			69.10
I	10.39	41.84	48	95.15
H	20.20	40.21	40	84.80
G	20.36			83.90
F	31.63			72.00
E	22.87	36.28	41	81.60
D	38.77			67.55
C	7.96	44.48	46	98.20
B	9.98			95.80
A	10.51			95.30
Bin.	21.10	40.60	38	84.09
Chats and Road Rock	17.75			88.85
Gr. Qy.	0.47	0.5 (approx.)	99	98.95

Layers A, B, and C, which appeared similar in the field and in the rock descriptions, carry about the same amount of acid insoluble impurity, approximately 9.5 percent. Actual $CaCO_3$ and $MgCO_3$ are both high. This is the best unit in the quarry to furnish high-test stone. If one were to go out prospecting for a quarry site, he would choose a place on the valley bluff (where this rock was exposed) so that layers A, B, and C would be quarried most efficiently and with minimum stripping and mining expense.

Layer D immediately above contains about four times as much insoluble impurity, almost 39 percent, as did A, B, C unit. Obviously it

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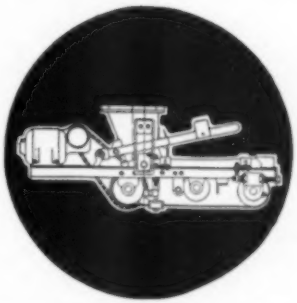

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should be segregated if possible. Practical considerations of cost of separation come in when one is loading lump rock on trucks to go to the crusher, but because D is a well-defined layer and easily recognizable in broken lumps, some of it could be kept out of the agstone and saved for crushing into chats and road rock, which are also products of this quarry.

Layer E also runs fairly high in acid insoluble impurity, but it happens to contain a variety of trace elements, as will be seen later, so it merits being used for agstone.

Layer F is high in acid insoluble impurity. It is bringing down the general average of the quarry agstone.

Layers G, H, and I (especially layer I) are producers of good agstone. Their analyses show 80 to 89 percent combined calcium and magnesium carbonates.

Layer J is again high in acid insoluble impurities. From the viewpoint of producing high-grade agstone it might pay to remove as much of layer J with the overburden as is practicable. Moreover, it contains visible portions of chert (flint) which abrades machinery.

To check by laboratory analysis the field observation that layer J contributed impurities, a bin sample was collected and analyzed. The quarry production during the afternoon of the visit came from layers H, I, and J (the top quarry bench), which were crushed and run into the loading and storage bin. Hence the bin sample represented a mixture of layers H, I, and J. Its analysis showed 21.1 percent acid insoluble impurity and a $CaCO_3$ equivalent of 84. If only layers H and I had been quarried, their analysis should figure out to be (in ratio of their thickness) 13.2 percent acid insoluble impurity and a $CaCO_3$ equivalent of 92. The incorporation of layer J was lowering the $CaCO_3$ test from 92 to 84. Wouldn't you try to discard layer J in your quarry?

A comparative analysis of a selected high-quality, high-calcium limestone sample collected from the J. J. Griesemer quarry east of Springfield, Mo., is given as "Gr.Qy." at the bottom of the table. The $CaCO_3$ equivalent of this sample is high and its content of insoluble impurity is low. Almost no magnesium is present. Hence this stone is excellent for use where the soil need is for calcium, but the addition of it to a magnesium deficient soil would upset the Ca/Mg balance farther and might act as a detriment. Therefore, the agstones produced from both of these quarries have advantages and disadvantages, depending on what is needed; neither is a "universally best" agstone.

Trace Element Analysis

Trace elements are those occurring in amounts of about 0.1 percent and less. In limestones they include such elements as manganese, copper, cobalt, boron, zinc, molybdenum, and others. Fortunately only trace (very slight) amounts of these elements are necessary to activate or catalyze the uptake of major nutrients by plants and animals, but they are absolutely necessary. They are like the spark plugs in a gasoline engine; they are small and do not themselves move, but they are still absolutely necessary to activate the generation of power by the larger parts of the engine.

The trace elements in the limestone studied were analyzed by means of a spectrograph. Although a quarry operator producing agstone does not need to know how to operate a spectrograph, most men like to know how the gadget works, especially one that will detect accurately a few parts per million impurity in a material.

Primarily, a spectograph analyzes the colors of light given off by a radiant specimen. It is an optical machine which analyzes a refined kind of rainbow. For example, a sunlight which shines through a sheet of rain or mist is broken up into primary colors. Similarly, if a piece of limestone is heated (excited) to incandescence in an electric arc between glowing carbons, it will give off light showing colors characteristic of the various elements in it.

The light from the specimen in the arc is passed through a narrow open slit in the spectrograph and then through a prism or onto a grating which produces a "rainbow" of colored narrow lines similar to the slit opening. These lines of colored light are usually allowed to fall on and expose a photographic film in black and white, which when developed constitutes a permanent record of the anlaysis. A trained spectroscopist measures the location, the number, and the intensities of the lines which are left on the film and from them reports the kinds and quantities of elements which were "burned" or excited in the arc. They may be compared with a standard film which has been exposed to a selected amount of known chemical elements. The high sensitivity of the spectrographic method of analysis is not to be doubted, for it has been proved correct innumerable times simply by analyzing prepared and known quantities as just described.

Table 3
Spectrographic Analysis of the Limestone Layers

Layer or Specimen	Mn	Cu	Co	Zn	B	Ni	V	Mo	Cr	Ag	Sr	Ba	Ti	Sn	Pb
A	5^{-3} 0.1	3^{-4} .0006	...	...	2^{-3} .04	3^{-4} .006	...	...	.01 0.2	5^{-5} .001	.2 4.	.03 0.6	.1 2	...	...
B	2^{-3} .04	5^{-5} .001	...	5^{-3} 0.1	3^{-3} .06	3^{-4} .006	2^{-3} .04	...	.01 0.2	5^{-5} .001	.3 6	.03 0.6	.3 6	...	...
C	5^{-3} 0.1	1^{-4} .002	...	2^{-3} .04	1^{-3} .02	...	...	...	5^{-3} .01	5^{-5} .001	.1 2	.02 0.4	.2 4	...	...
D	.02 0.4	2^{-4} .004	...	3^{-3} .06	5^{-3} 0.1	...	5^{-3} 0.1	...	.02 .4	2^{-4} .0004	.2 4	.2 4	.3 6	...	...
E	.03 .6	5^{-4} .01	...	...	3^{-3} .06	3^{-4} .006	5^{-3} 0.1	...	.03 .6	2^{-4} .0004	.05 1.	.03 0.6	.2 4	...	2^{-4} .004
F	3^{-3} .06	5^{-4} .01	...	.02 0.4	5^{-3} 0.1	5^{-4} .01	3^{-3} .06	...	.03 .6	2^{-4} .0004	.02 0.4	.03 0.6	1.0 20	...	...
G	.01 0.2	5^{-4} .01	...	1^{-3} .02	2^{-3} .04	2^{-4} .004	...	...	.02 .4	2^{-4} .0004	.02 0.4	.03 0.6	.2 4	...	2^{-4} .04
H	.01 0.2	3^{-4} .006	...	1^{-3} .02	1^{-3} .02	2^{-4} .004	1^{-3} .02	...	.02 .4	5^{-4} .001	.03 0.6	.02 0.4	.2 4	...	...
I	3^{-3} .06	5^{-4} .01	...	...	2^{-3} .04	2^{-4} .004	...	2^{-3}	5^{-5} .01	...	.05 1	.03 0.6	.1 2	...	1^{-4} .002
J	.02 .4	1^{-3} .02	...	...	3^{-3} .06	5^{-4} .01	1^{-3} .02	3^{-3}	.01 0.2	2^{-4} .0004	.3 6	.2 4	.1 2	2^{-4} .004	3^{-4} .006
Bin	1^{-3} .02	2^{-4} .004	...	...	1^{-4} .002	1^{-4} .002	...	...	.02 .4	2^{-4} .0004	.05 1	.03 0.6	.2 4	...	2^{-4} .004
Chats and road rock	3^{-3} .06	1^{-3} .02	...	1^{-3} .02	1^{-3} .02	5^{-4} .01	1^{-3} .02	...	.01 .02	...	.2 4	.2 4	.2 4	...	...
Gr. Qy	.02 0.4	2^{-4} .004	...	...	...	...	...	...	2^{-5} .04	...	.1 2	.02 0.4	.01 0.2	...	...

Looked for, but not detected in all above samples: Cd, Li, Bi, As, Sb, Be, Ga.

• The upper figure of each layer-element analysis is percent of the rock. For example, 2^{-3} means 2×10^{-3} percent or 0.0002 percent. The lower figure reports the pounds of the element per ton of limestone. For example, 0.1 means 0.1 pound, 1.6 ounce, of that element per ton of limestone. The weight of top soil (6.7 inches) may be taken as 2 million pounds.

Results of the Trace Element Analysis

The results of the trace element analysis of all samples from the M. F.A. quarry are shown in Table 3. Each element is reported in two ways: in percent present on the top line, and in pounds per ton of limestone on the bottom line. The analysis is in terms of the individual element, not in a combination, like the carbonate, oxide, or phosphate. This is the custom in reporting spectrographic analyses and is preferred because we do not truly know how the trace elements are combined in limestone. It is significant, however, to recognize that each pound of element is equivalent to a higher weight of compound usually added to soils. For example, one pound of boron is contained in 8.8 lbs. of borax, and one pound of manganese is contained in 2.7 lbs. of $MnSO_4$ (over 4 lbs. of 60 percent $MnSO_4$).

All of the data in Table 3 are too numerous to be discussed individually, but those of layer E, which has been mentioned before, will be reviewed. If two tons of layer E were put on one acre, it would furnish 1.2 lbs. of manganese (Mn), or a little more than one half part per million of Mn for the top 6-7 inches of soil. That quantity would not go far toward replacing all of the Mn needed if the soil were entirely depleted of Mn. However, if the soil were normal in Mn content, the agstone would contribute significantly toward replenishing what the plant crops remove during ordinary farming.

Copper (Cu) would be added to the extent of about one-third ounce in two tons of layer E. Cobalt was not detected in the limestone, but very slight amounts of it may have been present because analytical sensitivity is low for cobalt. Zinc (Zn) was not detected in layer E, but two tons of layer A would furnish more than three ounces of the element. Boron (B), nickel (Ni) and venadium (V) occur in small amounts.

Molybdenum (Mo), recently found by scientists to be necessary (but in exceedingly small amounts) for plant development, was not detected in layer E although tiny amounts were found in layers I and J. Chromium (Cr) is present in all layers of the quarry. Silver (Ag) occurs in amounts selling now for about one cent per ton of rock. The quarry is not a silver mine.

Strontium (Sr) and barium (Ba) are comparatively abundant. Their needs have not been established in plant nutrition but their effects have

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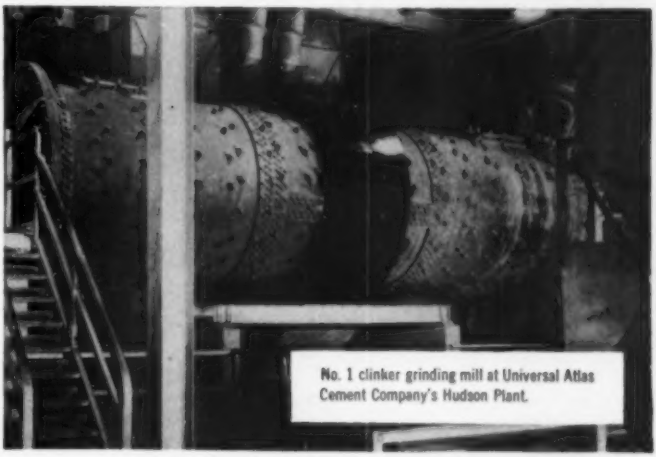

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ON various types of grinding jobs all over the country, Lorain Rolled Plate Linings are helping to increase production, save time, and cut costs. Because the parts are made to accurate size and in easily-handled sections, they save hours of labor and reduce mill down-time. And because of the great strength of the rolled steel from which they're made, plates of reduced thickness can be used—thereby increasing the usable diameter of the mill and boosting output.

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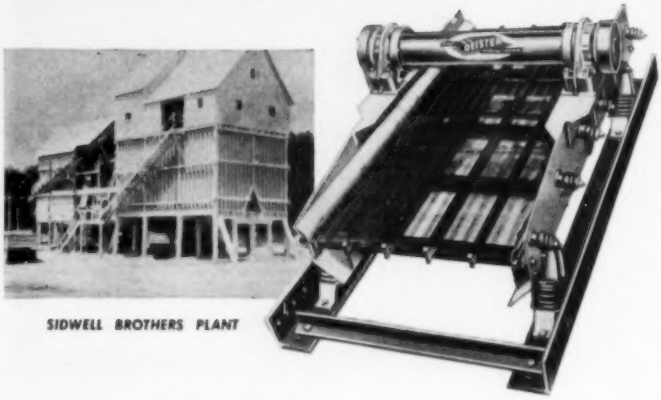
1st Production report on New Deister Ag-Lime Screen



SIDWELL BROTHERS PLANT

One year ago, we released one of our new Ag-Lime Screens for production tests to Sidwell Brothers, Deavertown, Ohio. It performed so well that a second screen was added later.

Carl Sidwell sums up the exceptional all-round performance of the Ag-Lime Screen this way:

"As you know this is a very hard stone to screen. You really helped to solve our problem when you came out with this lightweight, steep-incline and high-speed screen. They are doing a very good job."

Both of the revolutionary Ag-Lime Screens at Sidwell are equipped with ⅛" square opening cloth and .041" diameter wire. Screen Number One is fed 30 tons an hour, with 10 tons going through. Moisture content is 1½ to 4%. Largest particle in feed is 1 inch.

Ag-Lime Screen Number Two receives 35 tons an hour, with 15 tons going through. Moisture content is ½ to 1½%. Screen cloths last an average of five months.

This is high-capacity handling and accurate sizing of damp sticky materials without blinding. The new Deister Ag-Lime is revolutionary: lighter in weight, operates on a faster stroke cycle — especially designed to handle aglime and other damp fines. The experience of Sidwell Brothers is proof enough that for economical screening of agricultural limestone, you can't beat the new Deister Ag-Lime Screen. For particulars, write for Bulletin No. 51 today.

DEISTER SCREENS

DEISTER MACHINE COMPANY

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not been closely studied. Titanium (Ti) is usually abundant in all soil. Tin (Sn) and lead (P) occur sporadically in the quarry layers.

It is interesting to note that the high calcium limestone (sample Gr. Qy.) contains fewer trace elements than does the dolomite.

Agstone Is Not a Soil Medicine

The usual comment of the average observer after looking at trace element analyses is to the effect that the trace elements occur so scantily in limestone as to be of little significance. Such a conclusion usually comes from one who wishes to supply all the trace element needs to a deficient soil with one application of limestone. Fortunately, limestone does not contain large therapeutic doses of trace elements. If it did, soils would soon reach high toxic contents of trace elements during normal liming. Limestone is added as a *soil nutrient replenisher*, but not as a medicine.

A normal soil needs replenishment of the losses through ordinary cropping, leaching or fixation. A deficient or distressed soil needs special treatment by adding large quantities of particular elements, minerals, or rocks. In some regions where particular deficiencies are general the agstone may be fortified by regularly enriching it with special, Mn, Cu, Co, Zn, or other minerals.

Fortunately, however, ordinary agricultural limestone is not excessively rich in all trace elements.

Summary

The following points have been emphasized in this article. Limestones vary in composition and quality from quarry to quarry, and from bed to bed in a single quarry. Careful field study and sampling, followed by chemical and spectrographic analysis, will indicate where a quarry site should be located, and which beds of rock can furnish the product desired.

Chemical analyses should differentiate between Mg and actual Ca if the stone is dolomitic. The trace elements in a limestone contribute toward michonutrient replenishment but are usually not present in therapeutic doses.

A quarry operator may determine by careful samplying how to produce the highest test agstone possible.

At the Universal Atlas Cement Company's Hannibal, Mo., operation Francis A. Hennigan, superintendent, announced that two of the firm's ten kilns there will be shut down. He indicated that the reduction would be temporary,

New Crushing Plant

(*From page* 113)

linoleum, billiard chalk, welding rods, paint and fine papers. Most of this stone is pulverized without calcining. Most of the blue, or darker, stone is sent to the kiln and burned.

The six individual stone bins, which are of rounded-bottom, flared-top, suspension-type steel construction, are arranged in two parallel rows, each having a spalls bin at one end, a white rock bin in middle, and a kiln stone bin at the other end; total length, 60 ft.

The bottom of each bin is fitted with a short-centered heavy-duty feeder by means of which the stone can be reclaimed uniformly to two Link-Belt 36-in. wide, 56-ft. centers horizontal belt conveyors (one conveyor under each row of bins). These conveyors discharge at head end to an inclined 36-in. wide Link-Belt conveyor, 78 ft. long, extending (at right angles) to the mill building.

Or the kiln stone can be reclaimed directly from kiln stone bins into cars for haulage on narrow-gauge track to the kiln building.

Stone can also be reclaimed on the two belt conveyors at the rate of 100 t.p.h. when operated in reverse to recirculate the stone back to the bucket elevator.

A series of shock-absorbing rubber-tread troughing idlers is located at each place where stone is delivered to the conveyor.

In the mill building the inclined belt discharges to a Pennsylvania hammermill. Flap gates in the discharge chutes permit delivering the pulverized product to either the "whiting" elevator or the "RM" bucket elevator, the name of the elevator indicating the use to which this particular type of ground stone will ultimately be put. Bucket elevators discharge to horizontal 12-in. diameter screw conveyors supplying the bins that serve the various grinding mills.

The new rock crushing and sorting plant is a big step ahead of previous methods, which required considerable manual labor in the quarry to break up the stone sufficiently for direct delivery into a hammermill.

W. W. Wallace is the local plant manager. E. B. Hollingsworth is production manager. L. R. Sanderson is vice-president of operations; F. A. Manske is general production manager in charge of manufacturing operations at the company's 23 plants.

Kiln Draft Control

(*From page* 116)

through a duct. The draft connection is made to a venturi tube which is placed in the duct so that some of the incoming air passes through the tube, aspirating a suction on the draft gauge. Hence it is actually a flow meter.

We use draft gauges to establish and maintain correct fuel ratio. We analyze the kiln gas and adjust the draft reading with the kiln damper until we get the correct fuel-air ratio. We then maintain this draft. This is all right when the draft gauge indicates flow and not pressure, but why not eliminate the gauge entirely for this purpose? Control the damper or air input directly from the gas analysis. From a combustion standpoint, we do not care whether there is 2 in. draft or 8 in. draft as long as the fuel-air ratio is correct. So why use this mistake-making go-between? Control the fuel-air ratio with gas analysis and use the draft gauges to tell the condition of the charge. If this is not possible, connect the draft gauge as close as possible to the air inlet.

As obvious as the above is, it is

OSGOOD

Air cushion clutch wins praise from Industrial Silica Corporation

"Our experience with Osgood Air-Cushion Clutches has been most satisfactory; operators are well pleased with them, and maintenance has been practically nil," writes the operating Vice President of Industrial Silica Corporation, Youngstown, Ohio. The Buckeye firm has had three Osgood shovels with Air-Cushion Clutches in continuous use since they were purchased about 20 months ago.

Look at the typical operation shown above. Here's work that requires maximum ability to absorb shocks, and places a premium on fast, uninterrupted production. The Osgood Air-Cushion Clutch, with air control, completely eliminates jerking and grabbing . . . provides fast, velvet-smooth action that permits accurate control of loads at all times and reduces wear on both men and machines. Trouble-free clutch has only one moving part . . . greatest advancement in power shovel design in 25 years. Be sure to see Osgood before you buy.

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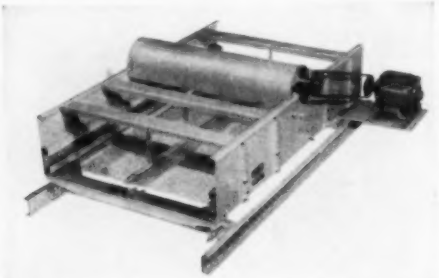

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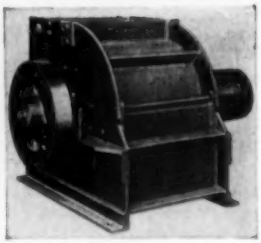

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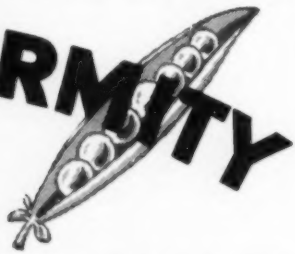

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very strange that kiln manufacturers still instrument their kilns to control fuel-air ratio by stack draft rather than inlet duct draft or gas analysis.

Pennsalt Centennial Report Shows Highest Sales in '49

The Pennsylvania Salt Manufacturing Company, celebrating its centennial this year, has announced in its Ninety-ninth Annual Report that sales for 1949 totaled $33,173,199, the highest in the company's history and $742,489 higher than in 1948.

Consolidated net profits for the year ended December 31, 1949, were $2,686,760, also the greatest in any year of the company's existence. This profit was $402,527 better than in 1948 and was $961,233 higher than the Company's average profit for the previous ten years.

After allowing for dividends on the preferred stock, the 1949 net profit amounted to $3.30 per share of common stock, as compared with $2.78 in 1948.

"Two main factors contributed to these increased profits," said George B. Beitzel, president. "One was the increase in sales. The other was the reduction of manufacturing costs realized from our postwar expansion and improvement program."

The 1949 report includes four charts showing the development of the company since its founding and includes other historical matters of interest. Expenditures for added manufacturing capacity and for improvement of existing plants, equipment and facilities, as indicated in the report, amounted to approximately $4,000,000 during 1949, as compared with about $7,480,000 during the previous year.

Game Reserve Opened for Loomis Hunters and Anglers

Employees of the W. H. Loomis Talc Company at Gouverneur, N. Y., obtained an amended contract which gives them a wage increase of 5 cents per hour, two additional paid holidays, and exclusive hunting and fishing rights on the company's 3,000-acre game preserve. The game lands in the Adirondacks had been closed to sportsmen since 1925.

In return the union extended the contract another year, to March 1, 1952. The 150 Loomis workers will take to the hills and streams as soon as the law allows.

Ash Grove Adds New Trucks At Louisville, Neb., Plant

At the Louisville, Neb., plant of the Ash Grove Lime & Portland Cement Company five 18-ton side-dump Easton Car & Construction Company trucks recently went into service. Autocar trucks were used with the Easton bodies.

Further improvements and expansion are said to be in the offing.

Competition, Labor Unrest Bring Decline in Dravo Sales

Net income of Dravo Corporation and its subsidiaries for 1949 amounted to $2,998,084, it was reported in the firm's annual report. This compares with the previous year's figure of $4,195,825. The net income was equal to $5.88 per share, after preferred dividends, on 495,374 shares of common stock outstanding. Comparable earnings in 1948 amounted to $8.28 per share.

Consolidated billings for the year were $49,737,894 and represented the second largest in the corporation's peacetime history, being exceeded only by the 1948 figure of $61,120,997. It was explained in the report that the decline in billings reflected the increased competition, as well as labor disturbances. Expenditures for new facilities and equipment during 1949 totaled $2,427,871; comparable expenditures in 1948 amounted to $2,124,567.

International Trade Fair Opens New York Headquarters

The First United States International Trade Fair has opened an office in the Warwick Hotel in New York City to prepare for the show, which will present a market place for producers from all over the world to exhibit their merchandise in Chicago from August 7-19.

Goods representing the entire range of consumer products and industrial equipment will be presented during the fair, which will be held in the four largest exhibition buildings in Chicago; the Navy Pier, the International Amphitheatre, the Coliseum and the Chicago Arena.

Products will include raw materials, semi-processed merchandise, high-production mass-produced articles, exclusive luxury merchandise and expensive machinery.

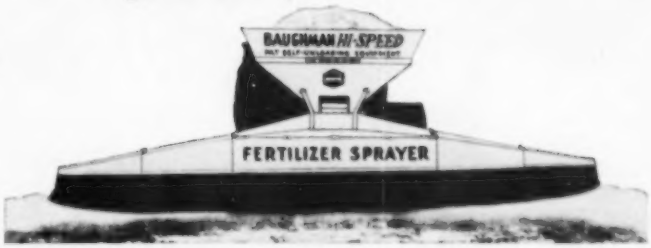
3M Workers Share Profits To Tune of $943,108

More than 6,300 employees of the Minnesota Mining & Manufacturing Company recently received checks for a share of the firm's profits in the fourth quarter of 1949. A total of $293,484 was distributed to employees at 28 plants and offices in 15 states.

This payment brought the total profit-sharing distribution for 1949 to $943,108. It was the 52nd consecutive quarterly payment made by the company under provisions of its general profit-sharing plan. The program is in effect for all permanent employees not participating in any other form of extra compensation.

Employee dividend payments are based on individual earnings for the quarter. Those with more than 30 months' service received checks for 7.2 percent of their total regular and overtime income for the last three months of 1949. Shorter-term workers received amounts based on their length of service.

new...



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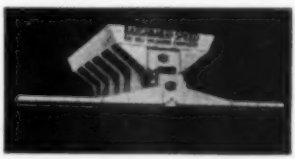
Holds the Spread to the Ground

For Baughman K, K-2 and K-3 Bodies. Prevents wind from scattering lime and phosphate spreads. Confines air blast from whirling distributor and directs spreading materials outward and groundward. Causes the spread to LAY and STICK. Sprays limestone up to 30 feet . . . phosphates and other fertilizers up to 20 feet. *NOTHING LIKE IT ON THE MARKET! FOLDS TO 8 FEET* easily and solidly for highway travel. Open (to 18 feet) and ready for work in a jiffy. Ruggedly built of 13 gauge alloy steel with no anchor braces or criss-cross rods. Heavy reinforced hinges. No moving parts . . . all parts replaceable. Heavy rubberized canvas curtain. *WRITE FOR PRICES AND FULL DETAILS.*



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HI-SPEED BELT AND BUCKET ELEVATOR. Large capacity . . . heavy duty. Lifts sand, gravel, other aggregates from 20' to 80'. Up to 90 tons per hour. Ruggedly built of high tensile alloy steel.

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TS . . . A medium weight bucket, classified as a general purpose bucket.

HS . . . A heavy duty bucket for moving shale or any hard formation.

Dirt moving men faced with the problems of keeping down maintenance costs will find the solution in HENDRIX DRAGLINE BUCKETS capable of peak production day after day with fewer breakdown delays. Hendrix Buckets are engineered for hard usage . . . to dig in quickly, come up with a full load, and dump cleanly . . . to take bumps, stress and strain in their stride. They're designed for long-time, low-cost operation. You, too, can do what others are doing . . . SWITCH TO A HENDRIX AND WATCH YOUR PROFITS SOAR!

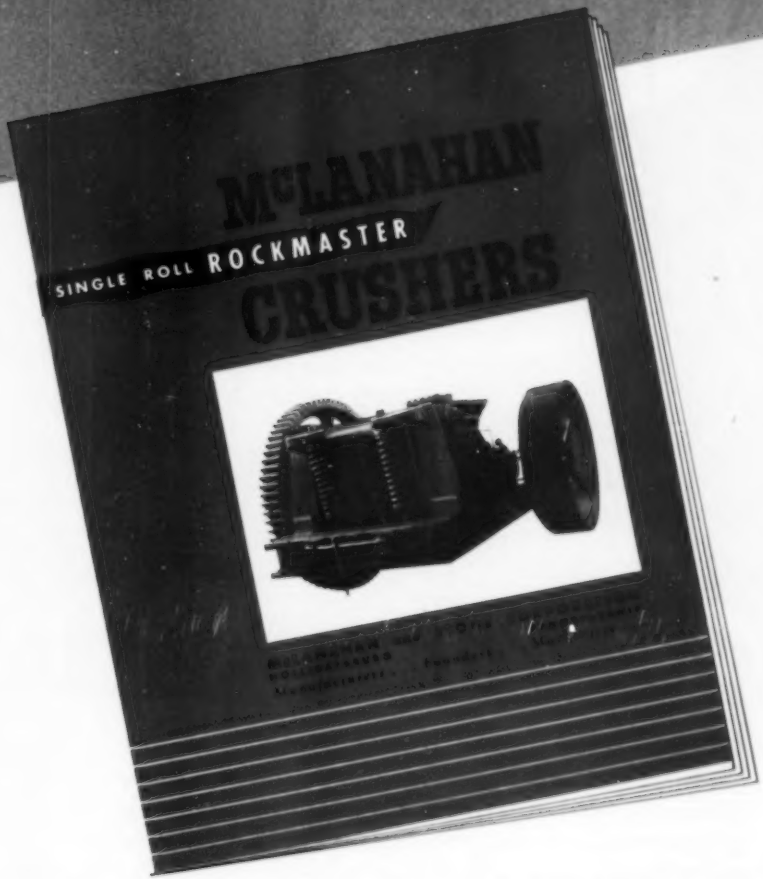
HENDRIX Lightweight DRAGLINE BUCKETS

For descriptive literature ask your dealer or write

HENDRIX MANUFACTURING CO., INC.

MANSFIELD — LOUISIANA

MODERNIZING YOUR OPERATIONS?



WRITE, PHONE or WIRE for this NEW BULLETIN

Here in this new bulletin are shown for the first time the very latest developments in heavy duty Rockmaster Crushers. Capacity charts, technical information—*everything* you will want to know if you are planning replacements or modernization.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

HOLLIDAYSBURG, PENNSYLVANIA

One Name-ALL TYPES

All over the United States . . . in Siamese chalk quarries, South African diamond mines, Turkish oil fields, Chilean nitrate mines, Alaskan gold fields—Russia, Egypt, China and so on criss-crossing the globe many times over, Philadelphia Gears have won their place as "quality gears" in the World's workshops.

For over 58 years, Philadelphia Gears have been produced in all sizes, types and materials . . . and, today our plant, machinery, facilities, men, methods and management are better able than ever before to serve you satisfactorily and promptly.

Send for our latest 68 page "Gear Book," and please use your Business Letterhead when writing for it.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON
IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

You Can Cut Today's High Production Costs with

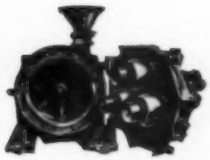
STURTEVANT EQUIPMENT

AIR SEPARATOR

For separation of fines to 325 mesh and finer. Increases output from 25% to 300% . . . lowers power costs by 50%. For years, this separator has been the standard in the cement industry.

DUSTLESS BLENDER

Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for ¼ ton per hour and up.



RING-ROLL MILLS

For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open-door accessibility. Many sizes. No scrapers, plows, pushers, or shields.

SWING-SLEDGE MILLS

For coarse and medium reduction (1" to 20 mesh). Open-door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.

JAW CRUSHERS

For coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

Sturtevant equipment, such as illustrated, helps you overcome high labor and production costs by increasing output. In addition, their rugged construction assures long life with minimum maintenance. It will pay you to investigate these machines. Write for information.

STURTEVANT MILL COMPANY
104-A CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

MAIL COUPON TODAY!

STURTEVANT MILL COMPANY
104-A Clayton Street, Boston 22, Mass.

Gentlemen:
Please send me your catalog. I am especially interested in _____

Name _____

Street _____

City & State _____

3 OF MANY REASONS
Why Leading Contractors Prefer Lippmann Equipment

"LIPPMANN PULVERIZER IN OUR QUARRY DOES A 2-PULVERIZER JOB!"

says DeHart Brothers, Kearney, Mo.

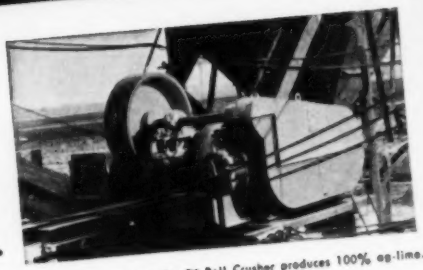
DeHart Pulverizer handles both quarry-run and over-size returns.

Look at the record of this 32 x 36 Lippmann Pulverizer at DeHart's Excelsior Springs quarry. Fed pit-run rock, from dust to 32 in., it produces 120 tons per hour "every hour of the day" of ag-lime "100% passing 8-mesh" without using all the horsepower the engine is rated to develop. After producing over 10,000 tons, DeHart has not even changed the hammer wearing surfaces.

Not only for ag-lime, but for road material, manufactured sand, coal or any friable material, there's not a machine made that can touch the Lippmann Pulverizer for high capacity, uniform cubical product, low maintenance and low first cost. Write for Bulletin 1160.

"LIPPMANN ROLL CRUSHER IS 100% BETTER THAN ANY OF THE SEVERAL OTHER MAKES WE'VE USED!"

says P. A. Bradbury, Aberdeen, S. D.



In Indiana, Lippmann 42 x 24 Roll Crusher produces 100% ag-lime.

And their letter continues, "Send us another 24 x 16 Roll Crusher *exactly* like the one we purchased Nov. 20, 1946." No wonder Bradbury Construction Co. wanted an exact duplicate of their Lippmann Roll Crusher — "In less than three years' operation, we produced 548,783 cu. yds. of gravel from hard rock . . . without any mechanical repairs. In fact, the rolls have never been taken apart, and only required building up the faces 6 times."

You, too, will find that Lippmann Roll Crushers save you money on repairs, minimize costly production shutdowns. Rugged construction, efficient operation, roll settings within 1/64 in. are reasons why you'll want to find out more about these profit-making machines.

"LIPPMANN SCREEN-ALL IS EVERYTHING WE WANT IN A VIBRATING SCREEN!"

consensus of Hundreds of Operators

Screen-Alls in tandem give mid-west quarry capacity, sharp sizing.

Yes, the Lippmann Screen-All, with its positive eccentric action and perfect circle throw, gives sharper sizing, greater capacities. Patented eccentric hubs and straight shaft design permits perfect counterweighting — no unbalanced forces give longer life, allow lighter substructures. New 3-point support simplifies leveling in the field. Placing bearings outside the screen body reduces headroom required. Quick-change Decks add flexibility for rapid changeover in case production must be shifted to ag-lime, stone, sand, etc. Get the full story. Write for your copy of Bulletin 1200 today.

2002
PRINTED IN U. S. A.

LEW

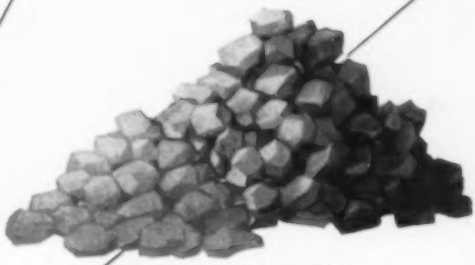
FOR ALL THE FACTS on the complete Lippmann line for pits, mines and quarries write for: Grizzly King Jaw Crushers (Bulletin 1100), Screen-All Vibrating Screens (1200), Pulverizers (1160), Belt Conveyors (1400), Gyre-Gnome Secondary Crushers, Circuit Rider Self-Propelled Crushing Plants, Portable Washing Plants, Apron Feeders (1450).

LIPPMANN ENGINEERING WORKS

4603 West Mitchell St., Milwaukee 14, Wisconsin

GREATER SAVINGS

BETTER BREAKAGE



MORE PRODUCTION

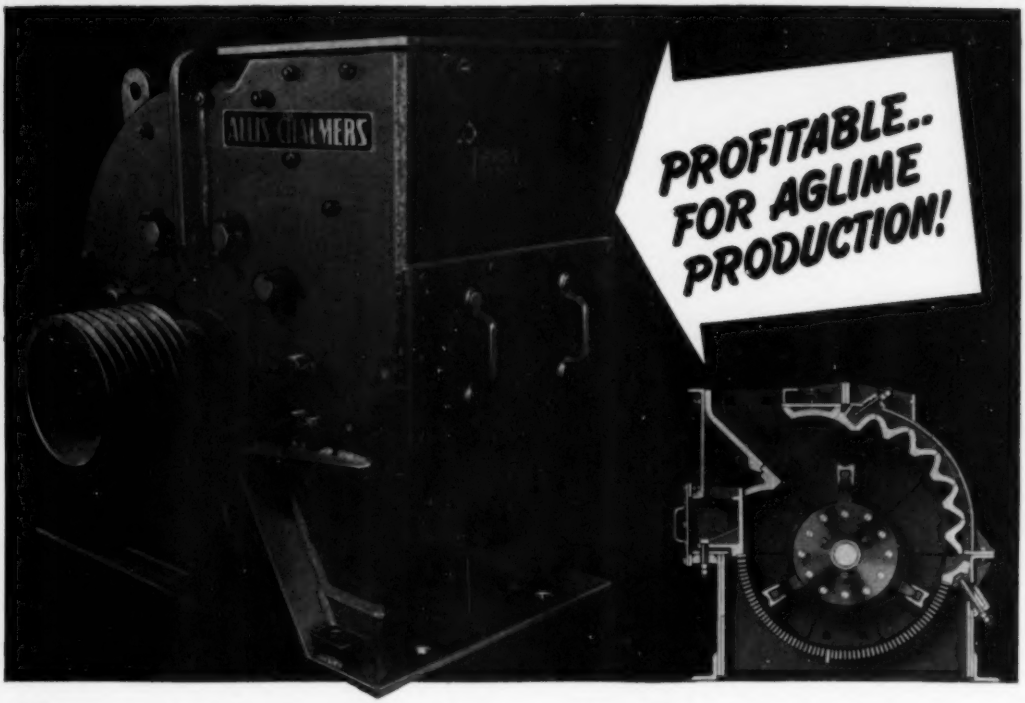
FOR LOWER BLASTING COSTS

You can save three ways by replacing older-type explosives with "Gelamites" and "Hercomites." These Hercules explosives give better breakage, greater production, and are more economical to use than extra dynamites and gelatins. Both "Hercomites" and "Gelamites" come in handy "Tamptite" cartridges. For further information, write for our illustrated booklet "Hercomites and Gelamites for Lower Blasting Costs."

HERCULES POWDER COMPANY
INCORPORATED
960 King Street, Wilmington 99, Delaware

"GELAMITE," "HERCOMITE" AND "TAMPTITE" ARE REG. U. S. PAT. OFF.

XR50-6



Get Fine, Cubical Particles in One Pass with *Pulverator!*

A SQUARE HIT is the most powerful breaking blow. The *Pulverator* hammer mill utilizes this important principle of impact crushing — it's designed so that revolving flat hammers hit each bit of feed *squarely*.

"MULTI-IMPACT" PRINCIPLE

Not only that — feed is hit *repeatedly* in the *Pulverator*. A succession of involute breaker plates is so arranged that material rebounds from plates to hammers several times. Repeated square blows . . . not glancing blows . . . break up the material thoroughly.

Feed particles are completely sized when they get to the bottom of the *Pulverator* . . . fall through grate bars readily. Power and maintenance factors are reduced materially.

CHECK THESE IMPORTANT FEATURES

- Renewable liners, breaker plates, hammers, hammer arms, grate bars.
- Hammers, grate bars also reversible.
- Grate bar spacers provide for product size adjustment.
- Removable doors . . . easy to service hammers, grate bars, rotor.

Five sizes handle up to 6-inch non-abrasive materials; capacities 2½ to 125 tons per hour. Get more facts from the A-C representative in your area, or write for **Bulletin 07B6265.** Allis-Chalmers offices or distributors in principal cities in the U. S. A. and throughout the world. A-5055

"TEAM UP" BASIC EQUIPMENT WITH MOTORS, CONTROL, TEXROPE DRIVES — ALL FROM ALLIS-CHALMERS!

ALLIS-CHALMERS, 974A SO. 70 ST.
MILWAUKEE, WIS.

Pulverator and *Texrope* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

DEPENDABLE
Is the word that best describes
KRAFT made-to-order
heavy-duty multi-wall
shipping sacks
produced in our new plant at St. Marys, Georgia
DEPENDABLE bag paper . . . made to exacting specifications in our own mill
DEPENDABLE bag design . . . by our own practical packaging engineers
DEPENDABLE workmanship...by personnel with long experience in multi-wall bag construction
DEPENDABLE plate-making and dependable printing with improved presses and inks
DEPENDABLE deliveries and service...by rail or water right from our own doorstep.
• Sewn or pasted—valve or open mouth—2 ply or up to 6 ply...you can depend on "Kraft" both as a source of supply and as a source of complete satisfaction.
KRAFT BAG CORPORATION
A DIVISION OF GILMAN PAPER CO.
630 Fifth Ave., New York 20, N.Y.
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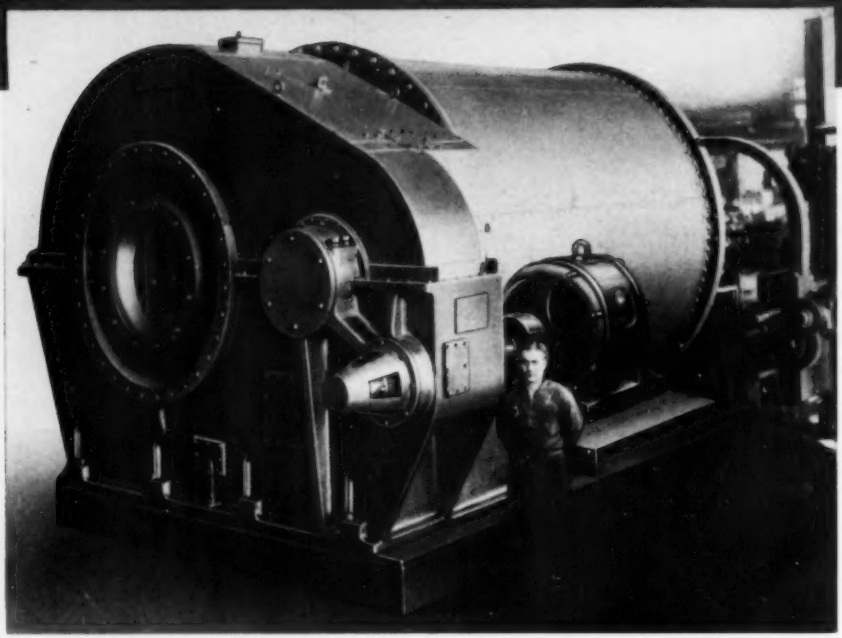
PAPER CO.
• St. Marys Kraft Corp.
• Gummed Tape Div.
• The Cellucord Corp.
• Kraft Bag Corp.
The long, white building in the foreground is the newly completed addition to the Kraft Bag Corporation's plant in St. Marys, Georgia
Send your product to market in a "KRAFT BAG"—the container for a thousand uses!

IT COSTS *LESS* TO OWN THE BEST!



KENNEDY INTEGRAL GEAR DRIVE AIR SWEPT TUBE MILL . . .

BUILT-IN FEATURES OF KVS BALL MILLS

Integral Gear Drive connected directly to driving shaft

•

Shaft carried in roller bearings. Cannot be misaligned or set wrong

•

All Gears and Bearings automatically oil sprayed

•

Requires less power to drive

•

Mesh sizes readily adjusted

KVS Tube and Ball Mills are versatile. They can be used as a rod mill, tube mill for wet or dry grinding or for air sweeping. Built to LAST, they provide trouble-free service year-in, year-out.

Our records show that in 15 years no gears or pinions have ever worn out. Compare this service record with any other mill . . . judge for yourself the quality of materials and workmanship which goes into these fine machines.

Made in any length or diameter required according to YOUR needs and OUR rigid specifications. The experience of over fifty years is applied in building a mill that will provide maximum service at continued low operating cost.

Replace your obsolete equipment with mills that will quickly pay for themselves out of increased earning capacity. Long life assures liberal dividends from the investment and, when you specify KVS equipment "It Costs Less To Own The Best."

Send for bulletin describing, fully, all types of KVS mills

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

TWO PARK AVENUE, NEW YORK 16, N. Y.

2 LINK-BELT SPEEDER K-360 SHOVEL CRANES DIG DEEP FOR HIGH OUTPUT

A thirty-foot face of tough rock is being cut back foot by foot, as two Link-Belt Speeder K-360 Shovels load out the shot rock in the Chandler Materials Co., quarry at Garnett, near Tulsa, Oklahoma.

Making money on operations like this takes tough machinery that stays on the job. Superintendent Ray Malang says these Link-Belt Speeders keep up their end of the schedule, their Speed-o-Matic hydraulic control makes them easy to handle and they are fast and dependable.

SPEED-o-MATIC CONTROL

Oil under pressure does all the work. Short throw, wrist-action levers release operating pressure in proportion to movement of variable pressure valves. Result — up to 25% more production over manually operated machines.

FEATURES LIKE THESE GIVE LINK-BELT SPEEDER 300 SERIES THEIR HIGH PRODUCTION AND LOW OPERATING COST

- Heavy duty construction throughout as evidenced by machine weight and exceptional lifting capacity.
- Speed-o-matic hydraulic control — 25% increase in production over conventional mechanical lever control.
- Heavy duty lower and upper main frames — all welded construction — stress relieved to remove all internal stresses.
- Crawler side frames are separate units detachable from lower frame — all welded construction — stress relieved — three interchangeable lengths.
- Steering arrangement designed for exceptional maneuverability.
- Self cleaning crawler tracks; double tread track rollers; superior crawler shoe design.
- Fool-proof crawler drive chain take-up assuring perfect and permanent alignment.
- Efficient, simplified power train.
- Ample engine power — choice of two Diesel engines.
- Independent rapid worm geared boom hoist available.
- Patented retractable high gantry available for long boom operation.
- Fully convertible.
- Chain crowd shovel attachment.
- Distributor service and repair parts facilities.

11.710

LINK-BELT SPEEDER

FOR LOWER OPERATING COSTS PER HOUR

If your replacement and down-time costs are getting out of hand—investigate Thermalloy for kiln parts.

Thermalloy was developed specifically to take heavy loads and rough usage . . . to resist corrosive gases, excessive heat (up to 2100°F) and abrasion. In scores of kiln installations, Thermalloy has proved it can give longer service—reduce maintenance costs on the job.

Thermalloy is not just one alloy. It's a *group* of alloys—each developed to meet a specific heat and abrasion problem. An Electro-Alloys engineer can show you how Thermalloy kiln parts can lower your operating costs—assist you in selecting the design best suited to your needs. Call your nearest Electro-Alloys Office, or write Electro Alloys Division, 2006 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.

FEED PIPES • CHAIN: CONVEYOR, DRAG • BURNER NOZZLES
OUTLET GRATES • FEED CHUTES • KILN SHELL SEGMENTS • KILN DAMPERS

Specify THERMALLOY* for heat and abrasion resistance . . . CHEMALLOY* for corrosion resistance

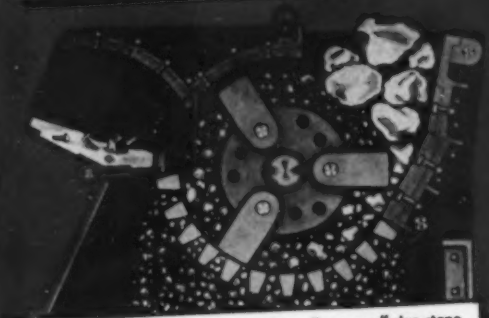
***Write for Technical Booklet*—Cast 26% CR. 20% NI Alloys**

AMERICAN Brake Shoe COMPANY

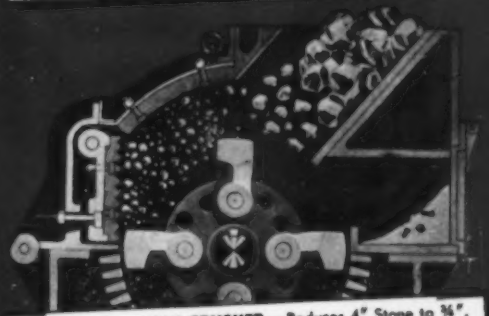
ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

WILLIAMS HAMMERMILLS for the ~~new~~ 1-2-3 PUNCH in the CRUSHED STONE FIELD

1 The **"SUPER SLUGGER"**—Reduces power shovel loaded rock to 1½" or ¾" stone in One Operation. Capacities 65 to 550 tons per hour.



2 The **"SLUGGER"**—Reduces "one-man" size stone (75 to 100 lb. pieces) to 1¼", ¾" or Agricultural Limestone in One Operation. Capacities 4 to 100 tons per hour.



3 The **"NP" CRUSHER**—Reduces 4" Stone to ¾", ½" or Agricultural Limestone in One Operation. Made in a large range of sizes with capacities from 5 to 200 tons per hour.

You save operating costs because stone is crushed to desired size in one operation ... You save installation cost because you eliminate the need for additional machinery, foundations, conveyors, power drives and buildings.

WILLIAMS ALSO MAKES ...

Impact and Roller Mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

USE OUR FREE TESTING LABORATORY

Submit your grinding problems to Williams. A sample of the material and description of the desired result will set our facilities to work on a solution to your problem. Visits during test runs and technical consultations are invited.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 ST. LOUIS AVENUE **St. Louis 6, Mo.**

WC-50-5

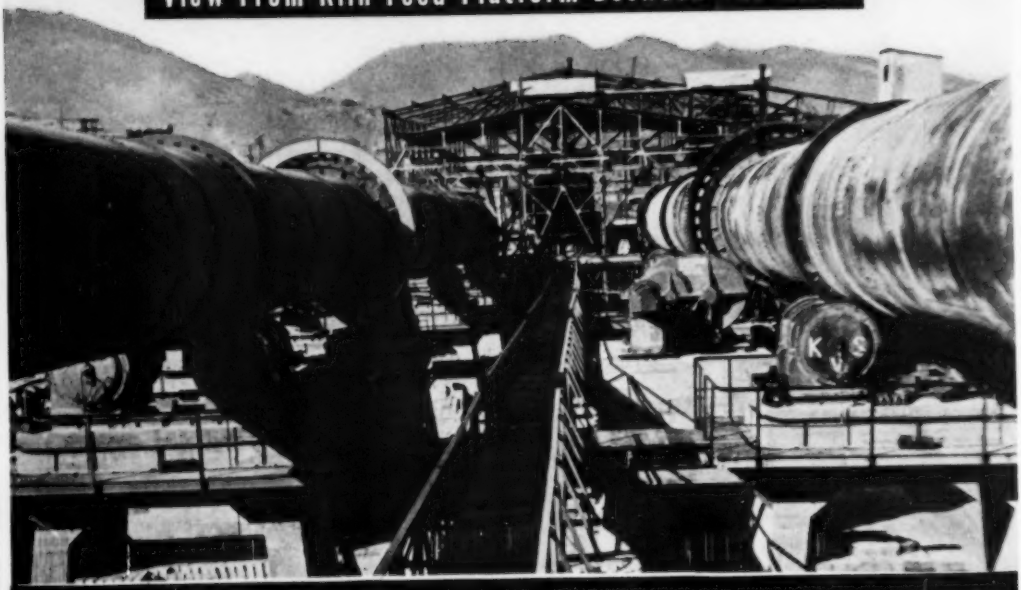
WILLIAMS

CRUSHERS **GRINDERS** **SHREDDERS**

OLDEST AND LARGEST MANUFACTURER OF HAMMERMILLS IN THE WORLD

IT COSTS LESS TO OWN THE BEST!

View From Kiln Feed Platform Between The Kilns



CAPACITY UNLIMITED!

Operated by gear reducer, driven by variable speed motor. Rotation of kiln may be increased or slackened, as desired. Entire operation controlled to keep pace with production needs.

Illustration shows two large KVS kilns with self aligning bearings. These kilns available in single or multiple units, built to meet your exact specifications.

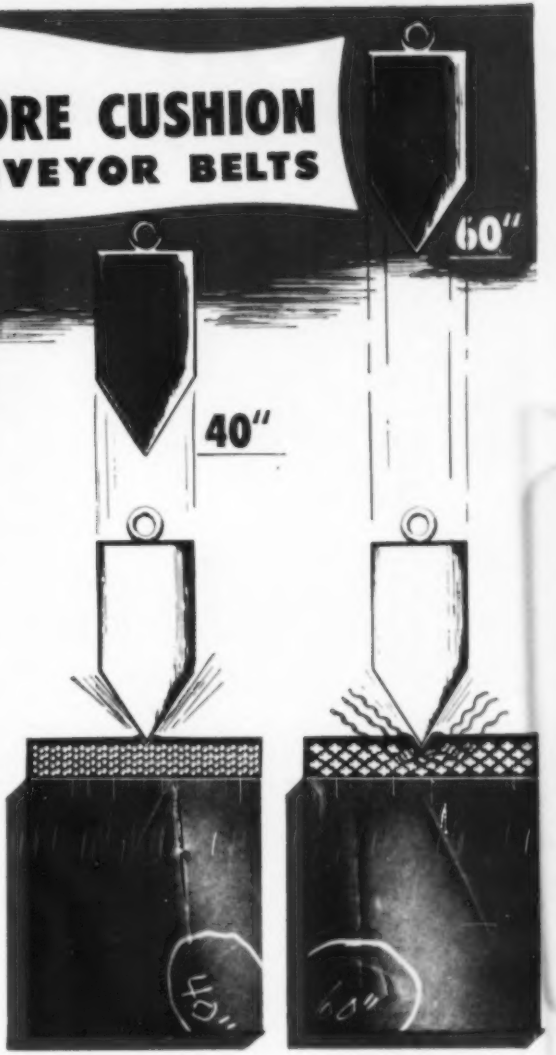
Let a KVS engineer review your plant needs and recommend the proper design and size kiln to meet your needs. Long life and dependable service distinguish *all* KVS products. It's the users who say "It Costs Less To Own The Best."

Send for bulletin describing
KVS Kilns, Coolers & Dryers

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION
TWO PARK AVENUE, NEW YORK 16, N. Y.

"GUILLOTINE" TEST

Proves 50% MORE CUSHION in *Homocord* CONVEYOR BELTS



When rocks like those shown here drop on a conveyor belt, every shock at loading point shortens the life of the belt. To overcome this, extreme cushion and resilience are built into Homocord Conveyor Belts. This "Through-and-Through" Cushion gives Homocord Conveyor Belts longer life than any other belt.

To measure comparative cushion and shock-absorbing qualities, Raybestos-Manhattan engineers devised the "killer" test shown at right. A heavy metal weight, ground to a blunt edge is dropped from various measured heights until it ruptures the cover of the sample under test.

Notice the shock lines indicate how a regular conveyor belt's "boardy" resistance to impact leads to cover gouging and breakdown. The shock lines on the Homocord cross section show how "Through-and Through" cushion and resilience of the Homocords absorb impact without injury.

Homocord CUSHIONED CONSTRUCTION HAS 8 ADVANTAGES

1. Complete bonding of every member into a homogeneous structure.
2. Holds metal fasteners, with no loss of draw-bar strength.
3. Lateral flexibility permits perfect troughing, accurate training, reduces fatigue of flexing at bend in troughing idlers.
4. Resists destructive action of continuous or heavy impact feeding.
5. Cushion Homocord body and low inelastic stretch reduce wear and tear of top cover.
6. Homocord body reduces hazard of punctures.
7. The Homocords are completely encased in Flexlastics; moisture not admitted, mildew cannot start.
8. Longer life, lower cost per ton.

REGULAR DUCK BELT

Unretouched photo shows actual rupture results of a 40" Guillotine Drop Test on a conventional 4-ply 32-oz. duck belt with 1/8" top cover, 1/16" bottom cover. With little cushion to absorb impact, the cover ruptures and deterioration sets in.

Homocord

Unretouched photo shows comparable degree of impact effect from a 60" Guillotine Drop Test on a 4-ply AEH Homocord Conveyor Belt with 1/8" top cover and 1/16" bottom cover. Impact of falling weight is dissipated through the Homocords, cushioned in Flexlastics.

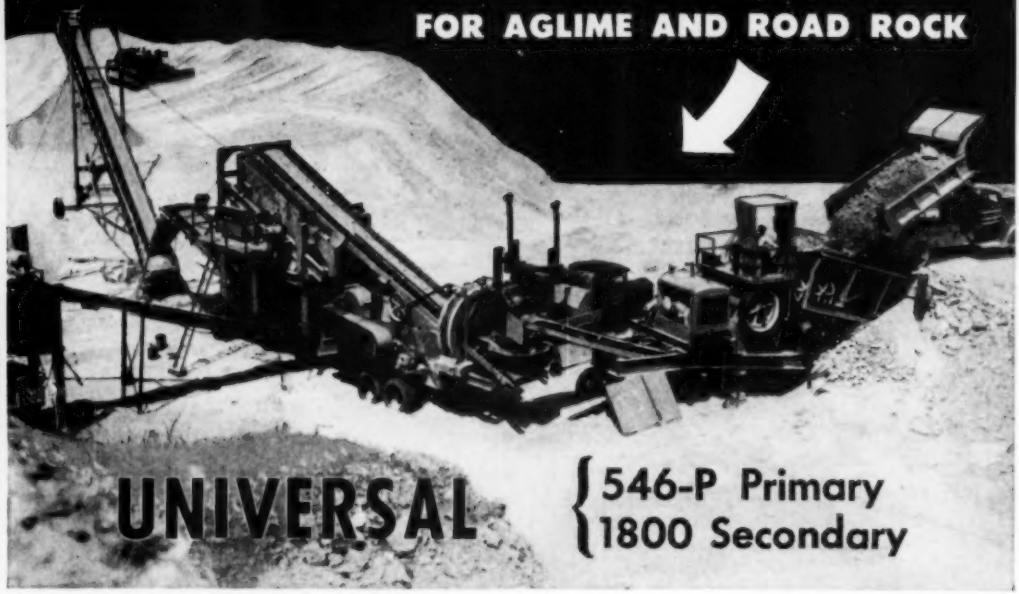
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

A RIGHT COMBINATION

FOR AGLIME AND ROAD ROCK



UNIVERSAL { 546-P Primary
1800 Secondary

For flexibility, portability, and profit-making capacity you can't beat this two-unit Universal "Stream-Flo" combination. It's a complete crushing, screening, and loading plant for volume production of either aglime or road rock.

The 546-P Primary is fed direct from quarry by power shovel, or trucks dumping from ramp set-up. It consists of a jaw crusher, shovel-loading hopper with built-in apron feeder, bar-grizzly and by-pass, operator's platform and ladder, under conveyor and power—all mounted on a gooseneck truck with pneumatic tires, brakes, and rear wheel equalizers.

The 1800 Series Secondary receives the output of the 546-P, screens out the finished aglime and road rock, and delivers the oversize to a Universal hammermill. The output of this mill is returned to the main conveyor by means of an underconveyor and Rotovator wheel. Finished products are delivered to trucks or stock piles by belt conveyors. By adjusting the hammers and changing the grates in the hammermill you can regulate the size of the finished product to aglime or road rock or both. The 1800 Series Secondary is available in 3 sizes with capacities up to 150 tons per hour of aglime and road rock.

LIMEROK UNIVERSAL 293QH

Highly mobile single-unit plant. Features 1824 or 2036 Jaw Crusher and No. 2, No. 3, No. 4 or No. 5 Hammermill. A combination that gives extra high production plus ready portability. Details in Form 293QH.

Universal builds a wide variety of "Right Combinations" for aglime and road rock production. Let Universal show you how to get volume production at a cost that leaves more profit. Write for Bulletin No. 551.

UNIVERSAL ENGINEERING CORP., division of PETTIBONE MULLIKEN CORP.

619 C Avenue N. W., CEDAR RAPIDS, IOWA
Phone 7105

4700 W. Division St., CHICAGO 51, ILL.
Phone SPaulding 2-9300

QUARRYMEN:

You're on top of

Bigger Savings

when you blast with...

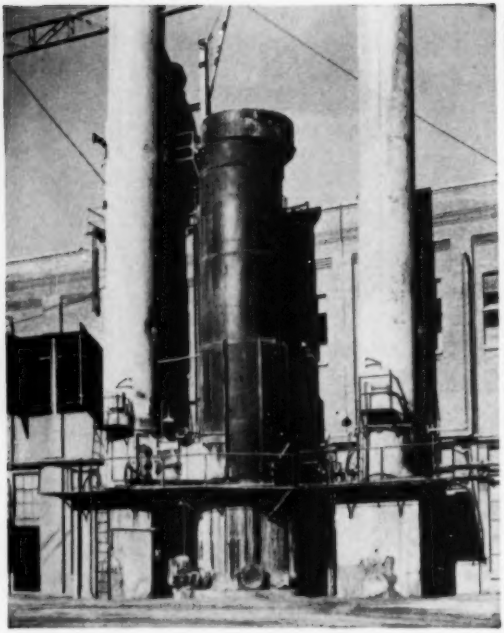
Detonite

You'll get *better breakage* and *cut your costs* for quarry blasting when you shoot with Detonite. This improved, patented quarry explosive shoots with a *slow, heaving action* that lifts and *fully* displaces the burden. More rock is broken in sizes easily handled by shovel and crusher. You'll have less secondary shooting—less wear on costly equipment—and get faster, more continuous operation. *That* means *less cost per ton!*

TEST DETONITE IN *YOUR* QUARRY . . . that's the best way to prove that Detonite gives better results. We will be glad to demonstrate Detonite's superior performance in your quarry at your request. Call in your King Powder representative, or write us direct. You'll profit by arranging that demonstration date *today!*

KING EXPLOSIVES

THE KING POWDER CO. INC.
CINCINNATI 1, OHIO . . . . . INCORPORATED 1878



Chemico P-A Cyclonic Scrubber

REMOVES 97% OF SOLIDS FROM KILN STACK GASES

Here is a typical example of the highly efficient action of the Chemico P-A (Pease-Anthony) Cyclonic Scrubber. In the paper mill installation shown, a P-A Cyclonic unit is removing 97% of solids from stack gases of a rotary kiln reburning kraft mud.

Other P-A Cyclonic Scrubbers provide up to 99% clean-up of gases from kilns burning raw limestone. These high clean-up efficiencies permit higher lime throughput.

ADVANTAGES:

- Increased lime burning capacity
- High efficiency
- Low consumption of water and power
- Low maintenance
- Low initial cost

CHEMICAL CONSTRUCTION CORPORATION

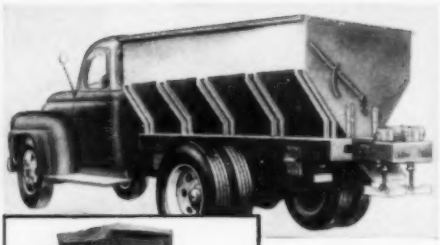
A UNIT OF AMERICAN CYANAMID COMPANY

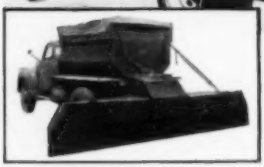
488 MADISON AVENUE, NEW YORK 22, N. Y.

EUROPEAN TECHNICAL REPRESENTATIVE
CYANAMID PRODUCTS LTD., BRETTENHAM HOUSE, LANCASTER PLACE
LONDON W.C.2, ENGLAND
CABLES: CHEMICONST, NEW YORK CC202

Chemico Plants are Profitable Investments

HEAVY DUTY *All Steel* LIME SPREADER





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OPERATORS REPORT:

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Up to 40% savings in fuel . . . .

ENGINEERED AND BUILT BY KVS...presenting the most advanced type of Lime production. Featuring gradual application of heat to the stone up to calcining point...cooling follows an equally smooth downward curve.

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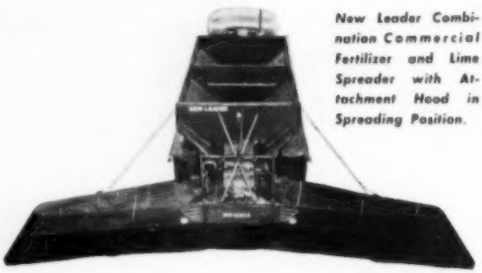

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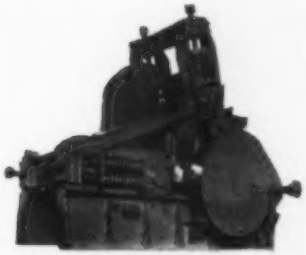

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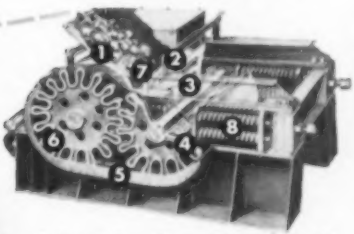

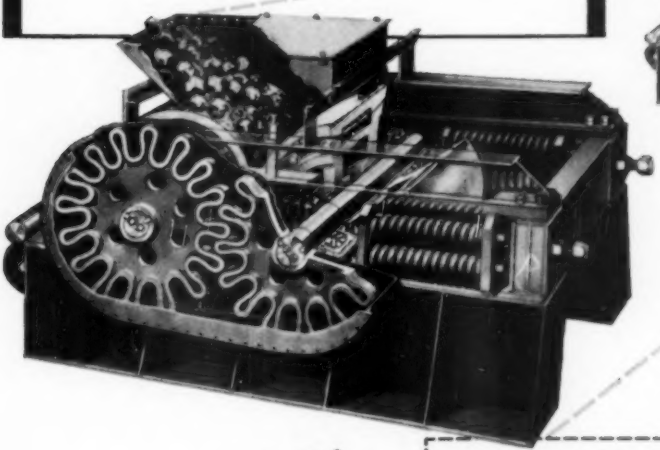

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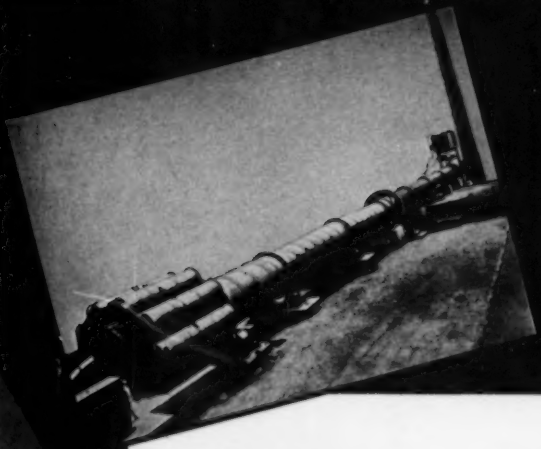

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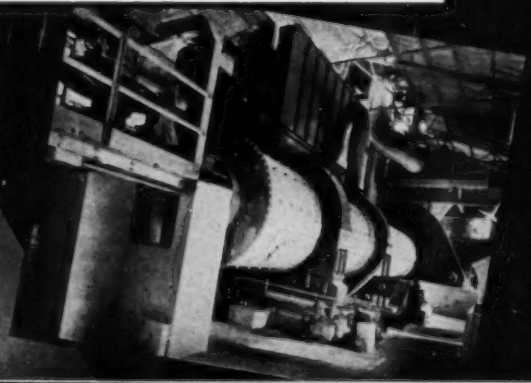

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Stricter Standards Sought by Perliters

THE Perlite Institute held its third semi-annual meeting in Chicago at the Knickerbocker Hotel on March 14 and 15. A wide cross section of the perlite industry was represented. In addition, the meeting was attended by representatives from the Portland Cement Association, the Gypsum Association, the National Foundation for Lathing and Plastering, the Lathers' Union, the Plasterers' Union, and the Metal Lath Manufacturers Association.

The first day of the two-day meeting was devoted to the discussion of

By EDWARD BRUNENKANT

perlite plaster, while the second day was reserved for discussions of perlite concrete.

Harry Lewis, chairman of the Institute's technical committee, reviewed the action taken by the American Standards Association regarding perlite plaster. The A.S.A. adopted a 7½-lb. minimum density and a 12-lb. maximum density for perlite to be used as a plaster aggregate. This action was taken despite the Institute's recommendation for a 6- to 12-lb. density range. Recent test results indicate that there is no direct relation between the density of the aggregate and the quality of the finished plaster. The members approved a technical committee's recommendation that the Institute urge the A.S.A. to adopt a 7- to 12-lb. density range, with the proviso that perlite aggregates falling outside this range be accepted if they show adequate compressive or tensile strengths.

To date there are no standard specifications for perlite concrete aggregate. Analyses of samples submitted by members of the Institute show for the most part that these aggregates fall within the sieve specification covered by the A.S.T.M. C-130 code. Another test showed that there is a direct relation between the dry density of perlite concrete (weight per cu. ft.) and heat conductivity (K factor). Plotting density against K shows:

Density (dry concrete)	*K factor*
20 lb.	0.60
25 lb.	0.67
30 lb.	0.77
35 lb.	0.91
40 lb.	1.08
45 lb.	1.27
50 lb.	1.48

Most perliters believe that the best market for perlite concrete (because of low weight and low K values) will be in poured roof and floor decks. The present thinking is that 850- to 1000-p.s.i. concrete is

• Left: T. C. Carter, president of the Perlite Institute (Great Lakes Carbon Corp.), and O. N. Gregg (Gregg Products Co., Grand Rapids, Mich.).

• Below: Dr. L. S. Wells (National Bureau of Standards); Albert Steiner (Underwriters' Laboratory); and P. H. Petersen (Housing and Home Finance Agency).

• The technical committee of the institute: Edward Jones (Midwestern Perlite Corp., Oklahoma City); J. J. Brouk (Precast Slab & Tile Co., St. Louis); H. E. Lewis (Great Lakes Carbon Corp.); Kirk Hazelton (Cleveland Gypsum, Cleveland, O.); and J. H. Bradford (Combined Metals Reduction Co.).

• W. J. Franklin (Pancalite Perlite, Inc., Kansas City); S. W. Johnson (Combined Metals Reduction Co., Salt Lake City); and Wharton Clay, secretary-treasurer of the institute.

adequate for the non-load bearing roof and floor slabs—strengths which are not too difficult to obtain with perlite aggregate. For structural purposes, it is possible although not generally economical, to make perlite concrete in strengths above 2000 p.s.i. These higher strength concretes can be improved, however, by blending perlite with other aggregates.

The Perlite Institute has worked out an arrangement with the John B. Pierce Foundation whereby the latter organization will investigate the properties and economies of perlite concrete. The project will be supervised by Dr. F. O. Anderegg.

P. H. Petersen, specialist on lightweight aggregates for the Housing and Home Finance Agency, reported on a compilation he has made of data developed by the National Bureau of Standards and the Bureau of Reclamation on lightweight aggregates. The F. & F. H. A. has attempted, with some success, to correlate the crushing strengths of aggregates to compressive strength of the resulting concretes. Compressive strengths of the aggregates were determined by measuring the load necessary to compress an aggregate-filled cylinder one-inch.

A California contractor reported unusual success with a concrete mixture consisting of 1/3 part haydite, 2/3 perlite and a cement ratio of 1 to 5. The resulting concrete weighed 85 lbs. per cu. ft. and had a seven-day compressive strength of 2000 p.s.i. This mix was built up into a 2½-in. wall by a spray process and has lasted more than 10 years without any sign of cracking or deterioration.

Some attention during the second-day session was paid to the practicability of adopting a standard bag for packaging perlite. Most members preferred the 4-cu. ft. bag. Final action was deferred until a poll could be conducted to ascertain the members' preference as to bag weight, number of plies, size, etc.

On the Thursday following the two-day meeting, the Perlite Institute sponsored a fire test on perlite plaster at the Underwriters' Laboratories. In the test the steel column, protected by perlite plaster, did not reach its critical temperature until after 4 hours and 50 minutes of exposure in the testing furnace. This was more than adequate to give the perlite plaster a 4-hr. fire rating.

The Perlite Institute maintains offices at 35 W. 53rd Street, New York 19, N. Y. Wharton Clay serves as secretary-treasurer of the association.

New "Quiz Film" Released By National Safety Council

Something new in training aids, a safety quiz film, has been announced by the National Safety Council.

The film, titled *What's Your Safety IQ?* shows common, unsafe, off-the-job actions and conditions which can cause accidents in the home, in traffic and in recreation. As each set of hazards is shown, workers are asked, "What's wrong with this picture?" They are given from 12 to 15 seconds to spot safety errors. Then the narrator points out the hazards in each situation and tells what could be done to remove or avoid them.

This film is available from the National Safety Council both as a 35 mm. sound slidefilm and in a new, inexpensive type of 16 mm. picture. Each has the same script and illustrations.

American Charcoal Co. Buys Fuller's Earth Properties

According to an announcement released by the Sinclair Refining Company, the American Charcoal Company of Detroit, Mich., has purchased the Sinclair fuller's earth mines and quarries at Olmsted and Caledonia, Ill., and plant at Olmsted, as well as the Standard Oil Company's fuller's earth mines at Olmsted. The new owner will reopen these operations in the near future.

The Sinclair plant was said to be the second-largest producer and refiner of fuller's earth in the world. It is located on the Big Four and the Ohio River and shipped its product via federal barge lines.

In charge of modernizing the newly acquired facilities for American Charcoal is C. D. Richardson, engineer, who has built and operated plants in Australia, England, Canada, Mexico, and other parts of the world. Micron classifying and calcining equipment will be installed as a part of the revamping of the existing facilities. The announcement of the transaction was made by Lloyd Cannon, former superintendent for Sinclair at Olmsted.

Consolidated Cement Plans Big Improvement Program

Consolidated Cement Corporation will retire the balance of its funded debt of $183,000 on June 1, 1950, according to the company's annual report. The company also contemplates a rehabilitation and improvement program for its Fredonia, Kan., plant and the development of company-owned limestone properties as a new source of supply for its plant at Cement City, Mich.

Smith W. Storey, president, pointed out in his letter to stockholders that the firm's net earnings in the year ended December 31, 1949, were $651,300 after provision for income taxes, as compared with $681,900 in 1948. Based on 99,916 shares of class A stock outstanding, Consolidated Cement's 1949 earnings equalled $6.52 a share, as compared wiith $6.82 for 1948.

Net sales of the company, declared Mr. Storey, increased to $4,560,200 in 1949, from $4,356,300 in 1948 and from $3,631,900 in 1947. Dividends totaling $2.10 per share were paid during 1949 on the class A stock.

Great Lakes Carbon's Perlite Carries Underwriters' Label

Permalite (perlite) plaster aggregate now is listed under the Underwriters' Laboratories Re-examination Service. According to an announcement by H. E. Lewis, manager of product engineering department of Great Lakes Carbon Corp., every bag of Permalite plaster aggregate shipped from plants at Torrance, Calif., Fort Worth, Tex., and Linden, N. J., carries the Underwriters' Laboratories "UL" label. This signifies that Permalite plaster aggregate is manufactured to the specifications determined by various tests conducted by the Underwriters' Laboratories from which various fire ratings for Permalite were established.

February Building Activity Smaller, but Tops February, '49

A mid-winter building record was assured by a less-than-seasonal decline in construction activity during February, according to reports from the Construction Division of the U. S. Department of Commerce and the U. S. Department of Labor's Bureau of Labor Statistics. The total value of new construction put in place during February amounted to over $1,400,000,000 off 5 percent from January, but 21 percent more than the total for February last year.

In terms of physical volume as well as in dollars spent, the amount of new construction put in place during the last four months has surpassed all previous records of mid-winter construction volume, including war construction in the winter of 1941-42.

Louisiana Firm's Gypsum Bed To Be Worked at Plant Site

According to a report from the Anderson-Dunham Concrete Company, Winnfield, La., a 20-year deposit of gypsum near its plant site has been found marketable for use in the manufacture of cement; and plans are going forward for mining the material as soon as possible.

Ted Dunham Jr., states that the deposits cover approximately 50 acres and contain enough gypsum to mine 10,000 tons per month for the next 20 years. Anderson-Dunham plans to ship the gypsum to plants in Memphis, New Orleans, Atlanta, and other cities in the South and the Southwest. It is reported that enough orders are in sight to keep production going at the rate of 10,000 tons per month.

Rock Crushing and Screening Lubrication Features* —Part I

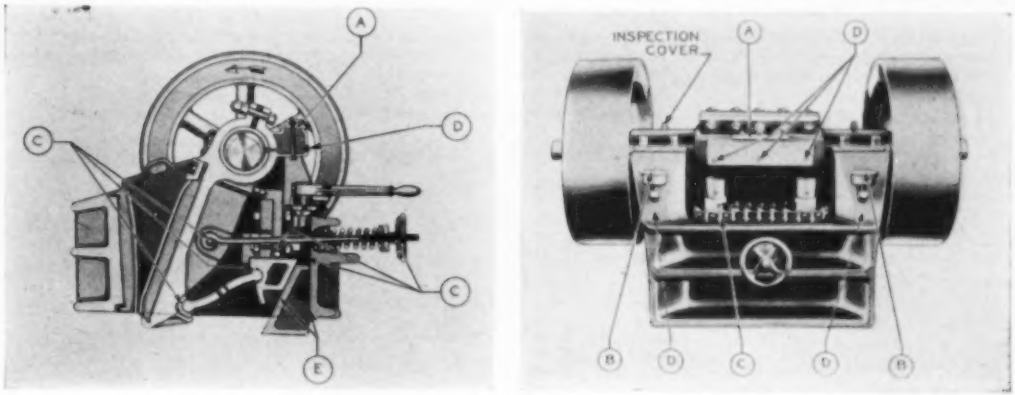
QUARRYING, crushing and screening of nonmetallic minerals is a major industry. It came into its own with the extension of our modern system of highways and the need for huge volumes of aggregates for construction purposes.

Quarrying has been practiced since the Romans built their famous roads and aqueducts; stone-cutting since the days of antiquity. But neither one was a coordinated industry, nor did either one lead to the development of machinery when we entered the so-called machine age. The quarry-man adopted existing devices which had been developed more specifically for mining. Builders of crushers, pulverizers and screens, however, were not content to borrow. They studied ways and means of perfecting crushing and grinding machinery according to the type of rock to be handled in order to obtain the maximum output at minimum cost for operation. They realized the importance of lubrication and the nonmetallic minerals industry profited accordingly.

Rock crushing and screening machinery as required in stone quarry and cement mill service is heavy-duty machinery. Accordingly, the bearings, gears and vibrating mechanisms are rugged, and must withstand the shock loading which may be off and on, speaking literally, due to the way in which the machines are built to operate. The jaw crusher—the "grizzly" in the service—is typical. Furthermore, these loads will vary according to the hardness of the rock. Bluestone or trap rock are among the harder types which must be reduced in size for road-building or railway ballast purposes.

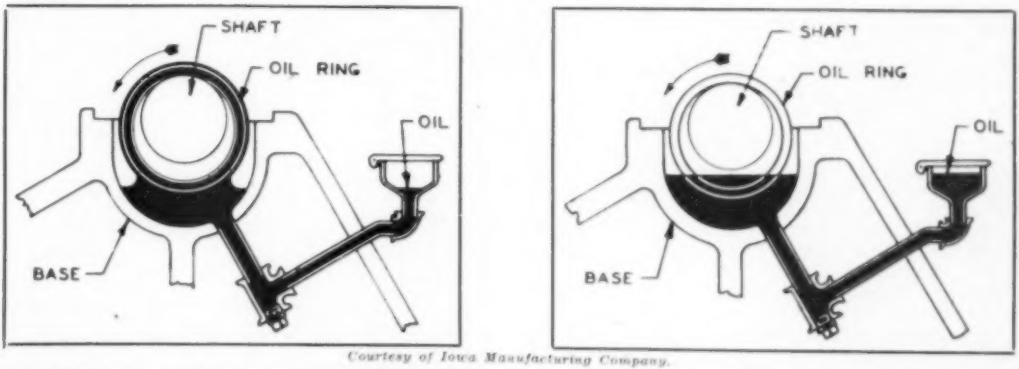
During this entire process of reduction in size there is naturally a lot of dust produced. In outdoor service this may not be much of a factor as a contaminant of the lubricants when the wind is right. Under cover, however, as in a cement plant, a walk through the

*Reprinted from *Lubrication*, October, 1949, by permission of The Texas Company.



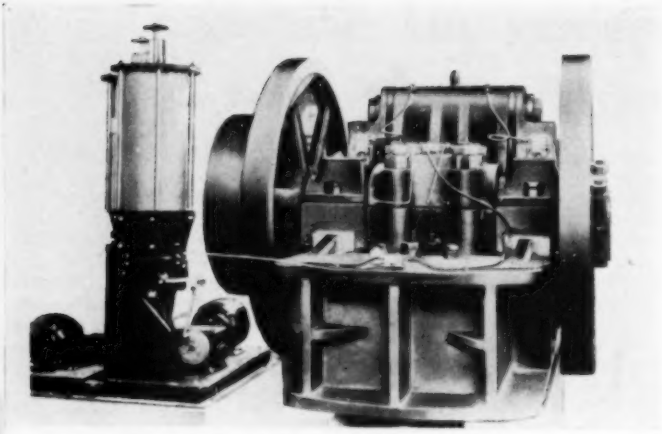
Cross Section View. Back View.

Figure 1.—Details of a Cedarapids Jaw Crusher with bronze bearings. A—shows pitman bearings; B—The side bearings; C and E—The adjusting mechanism; D—The drain plug.



Courtesy of Iowa Manufacturing Company.

Left: Oil level when crusher is standing still. Right: Oil level when crusher is in operation. Note the quantity of oil on oil rings causes oil level in oil cup to drop. Do not fill oil cup as long as oil can be seen in it.



Courtesy of Traylor Engineering & Manufacturing Co.

Figure 2—A Traylor type H Jaw Crusher equipped with automatic grease lubrication system.

mill will indicate how much dust can accumulate.

With the idea of protecting the moving parts of nonmetallic minerals machinery against the abrasive effects of this dust, the builders of lubricating equipment in turn studied the lubrication requirements of these heavy-duty machines along with the operating conditions. Then, in conjunction with the designers the bearings, gears, seals, housings and means of lubricant application were perfected.

The results of these studies are noteworthy. A type of heavy-duty machinery was produced which is distinctive for its utilization of means of automatic lubrication and the protection afforded the moving parts in the presence of abrasives which otherwise would quickly ruin a set of bearings or gear teeth.

SEQUENCE OF OPERATION

Handling of nonmetallic minerals requires machinery capable of crushing and grinding to successively finer materials. Essentially two distinctive types of operation are involved. The raw product must first be crushed on heavy-duty machinery, after which grinding and pulverization to accurately graded sizes is usually necessary. The jaw crusher, gyratory or heavy roll crusher does the primary reducing; roll, ball or tube mills are used for secondary or final reduction where accurately controlled fineness is required. Grading involves a third step in the separation of the fines by means of screens.

OPERATING CONDITIONS

In service these functions must be carried on with the bearings, gears and eccentrics subject to

Pressure—due to shock loads.

Moisture—due to humidity or even rain or snow.

Rock dust—which is always abrasive.

Temperature change—due to variations in atmospheric conditions.

METHODS OF LUBRICATION

Four broad classifications are involved in lubrication, i.e.,

Oil circulation on the gyratories.

Centralized pressure grease lubrication on certain types of crushers.

Unit lubrication by pressure grease gun, oil can or waste packed bearings.

Bath lubrication on enclosed or partly enclosed gearing.

Hand lubrication on exposed gears.

PRIMARY CRUSHING OR BREAKING

A primary breaker takes rock as blasted from the quarry reducing the size sufficiently to permit secondary treatment. The jaw crusher is of this type.

THE JAW CRUSHER

Jaw crusher design requires a hollow rectangular frame with a renewable breaking plate or die fixed at one end; opposing this is a lever or swinging jaw to which is attached a similar breaking plate. The fixed die is vertical—the swinging jaw being set at an angle and aranged to swing alternately back and forth. In this way crushing pressure is ap-

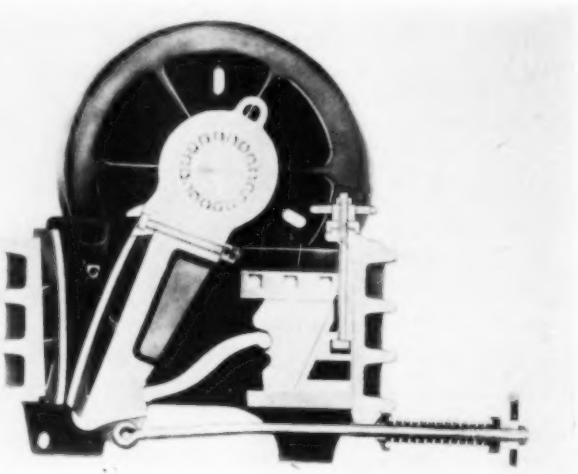
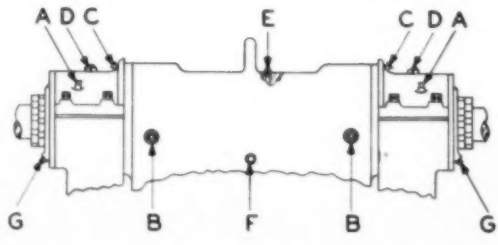
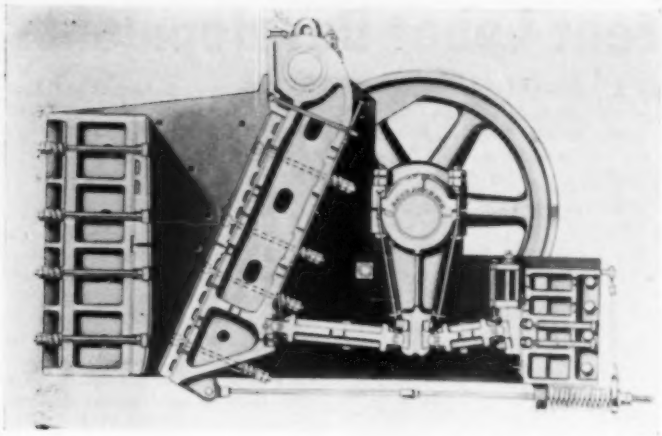


Figure 3 — Phantom showing pitman bearing of a Universal Jaw Crusher and lubrication instruction chart. A—shows the side bearings, 2 grease fittings; B—The pitman bearings, 2 fittings; C—End thrust lubrication, 2 fittings; D—Pipe plugs; E—Pitman flushing hole plug; F and G—Drain plugs for pitman and side bearings.

Courtesy of The Universal Engineering Corp. Div. of Pettibone Mulliken Corp.





Courtesy of Allis-Chalmers Mfg. Co.

Figure 4—Details of the A-C "A-1" Jaw Crusher which is equipped for automatic pressure lubrication. Motor driven pump furnishes filtered oil to crusher eccentric shaft and swing jaw bearings. Only toggle ends and seats are manually lubricated.

plied to the rock which is fed into the space between the breaking plates. Thus, a large lump of rock introduced at the top of the opening gradually is made smaller by the repeated blows of the swinging jaw until the pieces are small enough to drop through the discharge opening.

The swinging jaw is actuated by a link arrangement known as the pitman which is suspended from bearings integral with the frame and located about midway between the swinging jaw and the rear of the frame. The pitman is capable of vertical rolling motion developed by the turning of its eccentric shaft. This motion is transferred horizontally to the swinging jaw by the toggle action of two flat plates which are held by knuckle joints to the back of the swinging jaw, the pitman and the lower part of the frame. The weight of the swinging jaw keeps this toggle mechanism in proper position. The nature of the service classifies the jaw crusher as heavy-duty machinery. It is built accordingly.

Bearing Design and Lubrication

On this crusher, sleeve or roller bearings are used to good advantage due to their ability to carry heavy loads with evenly distributed pressure, and the facility with which replacement can be made if necessary. These bearings are provided for oil lubrication, or pressure grease lubrication and water cooling. The latter is very helpful as the pitman bearing, in particular will tend to overheat.

Lubrication of pitman and eccentric shaft bearings is assisted by certain features of design, i.e. (1) water cooling as stated; (2) links or coiled springs to relieve the pitman bearing of some of its load; and (3) grease seals and flexible dust guards to reduce the extent of contamination of the lubricant and enable maintenance of pressure on the lubricating film by retarding leakage. This is especially important in the lubrication of heavy-duty machinery where lubrication under pressure must be depended upon to partially counteract the mechanical pressure developed by the moving parts during operation.

Factors Affecting Lubrication

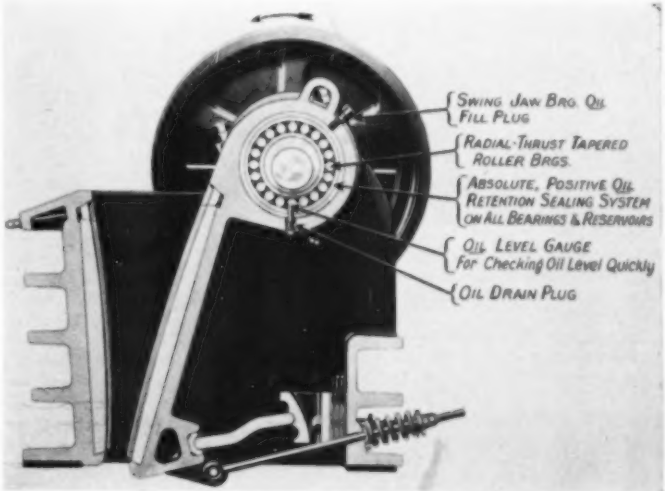
Crusher construction must always be carefully studied by the lubrication engineer. Final decision as to any lubricant should only be made after consideration of the probable loads developed at the bearings and the means available to provide lubrication at the points of maximum pressure to counteract these loads. Constant pressure on the lubricant is definitely advantageous in this regard.

Grease lubrication is preferred by many due to the ease with which it can be applied either by a pressure lubricator or by means of a reservoir provided with a wool yarn or pad retainer which will insure positive lubrication without too much loss.

A medium-to-heavy grease containing a comparatively heavy oil is required for pressure lubrication of these bearings. Pad lubrication, however, is more dependable when a lighter product is used which is sufficiently fluid to penetrate readily through the wool yarn or pad. A metal screen placed in the bottom of the reservoir will prevent strands of wool from working into the bearing clearance.

To assure protection, the lubricant must completely fill the clearance spaces at all times, and be sufficiently plastic to resist being squeezed out from the high pressure zone regardless of the means of application. Some crusher builders who design for pressure lubrication make sure of this by providing pres-

(*Continued on page* 169)


SWING JAW BRG. OIL FILL PLUG
RADIAL-THRUST TAPERED ROLLER BRGS.
ABSOLUTE, POSITIVE OIL RETENTION SEALING SYSTEM ON ALL BEARINGS & RESERVOIRS
OIL LEVEL GAUGE For Checking Oil Level Quickly
OIL DRAIN PLUG

Courtesy of Lippmann Engineering Works.

Figure 4A—Radial-thrust tapered roller frame bearings are oil lubricated with reservoir type oil bath lubrication also. They are filled, checked and drained, the same as the swing bearings shown on the cutaway.

Report on Current Labor Developments

By S. HERBERT UNTERBERGER
Director of Research
Labor Relations Information Bureau
Washington, D. C.

Merit Rating Data Must Be Furnished

THE National Labor Relations Board in a recent case ruled that employers are required, "upon request to furnish their unions with the name, classification, rate of pay, and merit rating score of each employee, and with full information with respect to individual periodic merit increases or decreases, including the names of employees who received such increases or decreases, and the dates on which such increases or decreases were put into effect". In making its ruling the NLRB went on to say that it regarded this information as necessary to the union if it was to police the contract effectively, to determine whether any discrimination existed, and to bargain intelligently for future contracts.

Furthermore, the NLRB observed that by its contract, the union ceded to the employer the exclusive right to grant unilateral individual periodic merit increases. Accordingly the employer did not violate the law by refusing to consult with the union before granting merit pay increases. It is significant, however, that this right was regarded as one which was conferred by the agreement between the union and the employer. The impression is left that if there were no specific contract provision to the contrary, it is possible that the employer might have been required to consult with the union before making a merit increase.

In view of this possibility, employers would be well advised to make sure that their rights with respect to merit increases are spelled out in the contract.

Conflict Between NLRA and FLSA

A classic example of an employer caught in the cross-fire between two federal labor laws, the Fair Labor Standards Act and the National Labor Relations Act was highlighted in a recent case.

In this case, it was the employer's established practice to permit employees to discuss their grievances with union officials during working hours. No employer representatives were present at these conferences.

An opinion issued in 1945 by the solicitor of the Department of Labor stated that "time voluntarily spent in grievance conferences during regular working hours pursuant to the established grievance machinery in the plant is considered to be regular hours worked under the Act irrespective of whether the conference is held with company representative or with a union representative". Thus such time would have to be paid for at the rate of at least 75 cents an hour plus time and one-half for all hours worked in excess of 40 per week.

However, the N.L.R.B. ruled in a recent case, just as it has ruled in previous cases, that if an employer pays for time spent in discussing grievances between an employee and the union representatives, with no employer representative present, he is contributing financial support to the union and that is a violation of the Act. No such violation would occur if an employer representative is present.

Thus, if an employer follows this practice and he does not pay for the time, he is in violation of the Fair Labor Standards Act; but if he pays for the time, he is in violation of National Labor Relations Act. A change in the practice where it exists is obviously called for.

Impending Change in NLRB Organization

From present indications, it looks as if Reorganization Plan No. 12 has a very good chance of going into effect. This is the plan which would terminate the office of the independent general counsel and would transfer his functions to the National Labor Relations Board.

The plan was sent to the Congress on March 13, and unless it is rejected by a constitutional majority of either house (i.e., a majority of *all* the members: not a majority of the members voting), it will go into effect 60 days later. This is the Administration's method for dealing with a problem which has vexed it since the passage of the Taft-Hartley Act. By this indirect method, the Administration may actually succeed in repealing one part of the Taft-Hartley Act.

When the Taft-Hartley Act established the independence of the general counsel, the principal purpose was to make the NLRB itself a judicial agency and to turn its functions as prosecutor over to a governmental official. It did not do a complete job of separating functions, since the general counsel still continued to act on behalf of the Board before federal courts which were considering appeals from the Board's ruling.

Some friction between the general counsel and the Board was anticipated, but it was expected that after the Taft-Hartley Act was in operation for a while, a harmonious working relationship would develop.

Almost immediately, differences of opinion arose between the general counsel and the Board in how the law was to be interpreted. In general the general counsel inclined toward a very literal interpretation of the law, while the Board inclined toward a somewhat less legalistic interpretation. Real difficulties developed when the general counsel, relying on his interpretation of the law, insisted on prosecuting cases which the Board, according to its interpretation, was sure to dismiss. The extreme situation developed when the general counsel expressed his unwillingness to defend a Board decision in the courts because he disagreed with that decision.

Regrettably, professional differences developed into personal animosities, and the general counsel and the Board attacked each other by rather transparent references in their public statements.

The labor unions added fuel to the fire. They regarded everything about the Taft-Hartley Act as hostile, and the independent general counsel symbolized the Taft-Hartley Act. They declared open war, demanding his removal and the abolition of the office. The defeat of the attempt to repeal the Taft-Hartley Act as a whole only made the demand to eliminate the general counsel more insistent.

The President apparently regarded the situation as a serious administrative problem. An agency of the government appeared to be destroying its effectiveness by internal friction. In addition, no doubt, some political advantage was to be gained from effectuating labor's demand. Hence, he employed an instrument close at hand—his power to reorganize executive departments—to accomplish the result which seemed to him to be desirable.

The important thing to be recognized is that should this organization move become final there are likely to be substantial changes in the operation of the NLRB even under the Taft-Hartley Act.

The Big Blast

POSSIBLY the largest commercial blast ever set off took place on March 21 at Union Pacific Railroad's ballast plant at Granite Canyon, Wyo., 19 miles west of Cheyenne. It is believed that the explosion, which consumed more than 130 tons of TNT, loosened up in excess of 1,250,000 cu. yds. of rock. This quantity of stone is enough for a year's supply of ballast. The plant is operated by Morrison-Knudsen Company and produces crushed and graded granite for the exclusive use of U. P. as ballast on its track roadbed.

The quarry at which the blast was set off has a face averaging around 120 ft. high and extending nearly ½ mile in length. The explosives were loaded into the ends of the tees extending off from each of 13 tunnels driven into the base of the cliff. Each tunnel measured about 3 by 4 ft. in cross section and was about 80 ft. long. (The length of each tunnel was determined by the height of the quarry face at the point of entry and was approximately 2/3 of the face height.) The crosscuts or tees were extended for a distance of 15 ft. on each side of every tunnel. About 25 ft. of stone was left between the ends of adjacent tees. The ends of the tees were enlarged to 6 by 8 ft. to insure adequate room for the explosives.

The tunnels were drilled with jackhammers and driven with gelatin dynamite. The tees were loaded with TNT, using a powder ratio of approximately 1.5 lb. of explosive to each neat cu. yd. of rock. All tunnels and crosscuts were completely backfilled to the tunnel portals. An air backfill machine using quarry waste was developed by Morrison-Knudsen for this purpose.

The holes were wired in series and fired electrically using 200-volt, 60-cycle a.-c. current. Fragmentation was excellent and it appears that very little secondary shooting will be required.

The yardage, amount of explosives, and drilling of tunnels and tees was checked and double-checked to insure a good blast, with nothing left to guesswork. Experienced explosives men were in charge of this operation.

All photographs used in this report were taken with an electrically-operated, rapid sequence camera set up about a half-mile from the blast.

• Upper left: Quarry wall at Granite Canyon as it appeared before the tremendous blast was set off.

• Upper right: Following the siren warning, the first indication of the detonation became noticeable when the 120-ft. rock cliff almost ½ mile in length began to bulge outward and crack up.

• Lower left: A huge column of orange and red flame belched into the sky and a cloud of smoke, dust and rock towered above the area and sprayed outward as the earth shifted noticeably under the feet of observers.

• Lower right: In the wake of the blast a considerably altered terrain emerged out of the smoke.

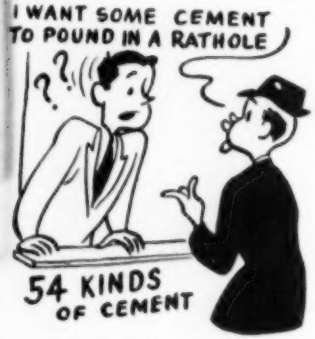
Screenings

by William M. Avery

FROM some of the clippings that have landed on our desk in recent weeks we get the impression that the nonmetallic minerals play more than a casual role in the dizzy events which make up the American scene.

Take sand, for example. It made the headlines when the "Mighty Mo" went aground in Chesapeake bay a few weeks back. And in Newark not long ago, when the city fathers bought some new snow fighting equipment, they fought sand with it 'cause there wasn't any snow around at the time. A mere 30-lb. bag of the stuff rated headlines in New York the other day by falling on the stage of the Empire Theater while actress Ethel Waters was taking a curtain call. It was a clean miss, too.

Industrial cements made news in a small way when a Pennsylvania firm announced that it now makes 54 varieties of the stuff. The Heinz



people had better look to their laurels. A lowly hunk of concrete was worth an item in the Minneapolis *Star* the other day when somebody pitched it through the window of a photo supply shop. The purpose, according to the newspaper, was "aparentlyp to get at hotographic merchandist." The rest of the account was in English.

The influence of the nonmetallics on contemporary affairs is by no means confined to our own borders. The A.P. sent all over the world an item from Hamburg, Germany, telling how a Ruhr rifle club, denied the use of firearms by the military government, held its annual shooting match on schedule by throwing rocks at the target. And a concrete mixer of unspecified make got wide publicity when a story went out from Vancouver about the small boy who was charged 30 cents by his older playmates for a ride in it, in the course of which he also got, at no additional charge, a black eye and a bloody nose.

There's something strangely gratifying about being associated, however remotely, with historic events of this magnitude.

Stone Age

THE following item came to us a few days ago from Gaffney, S. C., by way of the *New York Journal of Commerce*:

"Officials of the Limestone Manufacturing Co. of Gaffney have announced that installation of $2,000,000 worth of new machinery, designed to speed up production and reduce costs, had been completed in the two *textile* plants at Gaffney."

We're perfectly willing to concede than *any*thing is possible in the 20th Century, so for all we know they may be making textiles out of limestone, or maybe it's limestone they're making out of textiles. But we do wish they wouldn't speed up such operations before we've had a chance to admire 'em in low gear.

Busman's Holiday

AT the first annual meeting of the Virginia Ready Mixed Concrete Association the other day, some 35 producer-delegates were given a demonstration of the actual manufacture of concrete. That's one of the things we like about association meetings: there's always something new and novel going on.

Corn

FEDERAL and state research workers in Michigan have disclosed that it may soon be practical to use corn cobs as filler in concrete construction. We foresee difficulties ahead if cob-filled concrete ever becomes popular. Whenever "cobcrete" is mentioned in conversation, it will be necessary to ask the speaker if he really means "cobcrete," or just has a head cold. If the whole business weren't so revoltingly corny, we might suggest "corncrete" as a possible alternative.

Block Buster

THEY'RE doing some pretty cagey stuff with concrete products overseas these days. *This Week* magazine reports that a judo school in Honolulu uses small slabs, comparable to our patio blocks, for a demonstration in which a lady instructor breaks the units on her husband's tummy with a sledge hammer. From what we can see of the

slab in the pictures which accompany this fascinatin' story, the real trick must have been to keep the thing from falling apart before the hammer hit it.

Even so, it doesn't appeal to us much as a pastime; during that fateful second while the hammer descended, we'd always have a nagging suspicion that maybe *this* time the little helpmate might elect to knock our block off in the figurative rather than the literal sense.

Then from Moscow there comes the news that for 3,500 rubles ($875) you can get a concrete sculpture of Lenin. However, you'll have to exercise lots of patience; they can't make shipment for two or three months. That's a mighty long time to wait for something you've always wanted.

High Output per Man a Feature Of New Albuquerque Sand-Gravel Plant

ONE of the most progressive producers of aggregates and ready-mixed concrete in the Rocky Mountain area and now also one of the largest, is the Albuquerque Gravel Products Company of Albuquerque, N. M. This company got its start in May, 1945, with a small batching plant at the gravel pit. This was replaced in October, 1946, with a modern plant located near the heart of the city. Later both plants were enlarged and improved. The company's foresighted vice-president and general manager, Gene Sundt, still did not believe that existing factilities were adequate to meet the growing demand in this area and embarked on a half-million dollar expansion program which was completed late in the summer of 1949. Two new plants were built, a 200-t.p.h. sand-and-gravel plant and a central-mixing plant *with a capacity of 1000 cu. yds. daily. These supplement the existing gravel and ready-mix plants. Later the old gravel plant will be discontinued. The expansion program also included a new maintenance and repair shop.

The sand and gravel plant is at a newly-opened 80-acre deposit about 5 miles north of Albuquerque whereas the old plant is 2¼ miles south of town. There is very little overburden at the new site, while at the old location it was getting too heavy for economical operation. The old plant will be operated only until washing equipment is added to the new plant and will then be shut down. The new plant can be operated in an emergency by one man but it now has a crew of three men. It produces twice as much as the old plant with a crew of 15 men.

*See PIT AND QUARRY, April, 1950, p. 141.

• The new screening and batching plant of Albuquerque Gravel Products Co., Albuquerque, N. M. The excavating unit is a 4-cu. yd. drag scraper operating on a 500-ft. span.

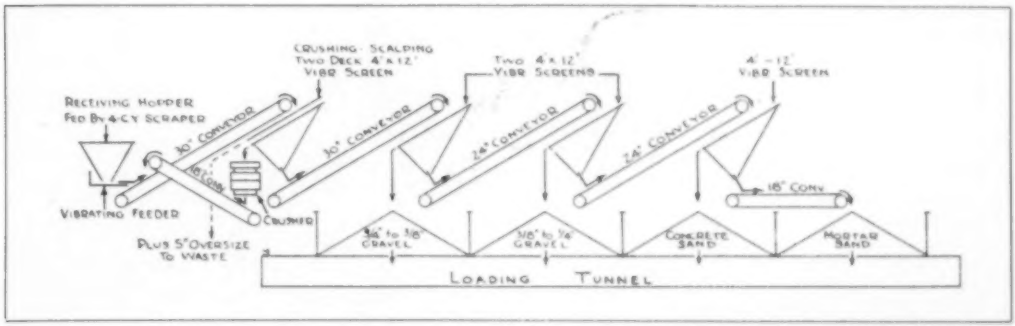
The new deposit ranges from 15 to 40 ft. in depth and was thoroughly tested before the plant was built. It is sound, hard material, varying somewhat in gradation but with 95 percent passing 3 in.

The material is excavated and brought to the plant with a 4-cu. yd. Sauerman Crescent scraper. This operates between a headmast and two tail towers set 200 ft. apart and at a radius of 500 ft. from the head mast. It is operated by a 3-drum Sauerman hoist driven by a 200-hp. motor. At its present setup the scraper can dig out 50,000 sq. ft. of the deposit. When this is done, the scraper system will be moved into the pit, and belt conveyors will carry the material to the plant.

The scraper discharges the sand and gravel over a grizzly, with bars spaced 12 in. apart, into a hopper. A 30- by 84-in. Jeffrey-Traylor vibrating feeder drops it onto a 30-in. by 40-ft. belt conveyor to the scalping screen. A rheostat at the screen controls the rate of feed. The 4- by 12-ft., 2-deck Cedarapids vibrating screen has two sizes of cloth on its top deck—½-in. on the first half to carry part of the fines, and 5-in. on the second half. The bottom deck has ¾-in. openings.

The plus 5-in. oversize is carried to waste. The ¾- to 5-in. gravel off the bottom deck drops into a 3-ft. Symons cone crusher, the product of which is carried on an 18-in. belt back to the 30-in. belt ahead of the scalping screen.

The minus ¾-in. gravel through the bottom deck of the screen is carried on another 30-in. belt conveyor (100 ft. long) to a pair of 4- by 12-ft. single-deck Cedarapids screens. These have ⅜-in. cloth, and the ¾- to ⅜-in. gravel off their decks drops into a stockpile.



• Flow diagram of the crushing and screening plant at the new Albuquerque Gravel Products installation.

• A general view of the plant, showing the scalping and crushing station at the left and the three screening stations over the storage piles.

The minus ⅜-in. material through these screens is carried on a 24-in. by 60-ft. conveyor to a second pair of 4- by 12-ft. single-deck screens equipped with ¼-in. cloth. Their ⅜- to ¼-in. product is discharged into a second stockpile.

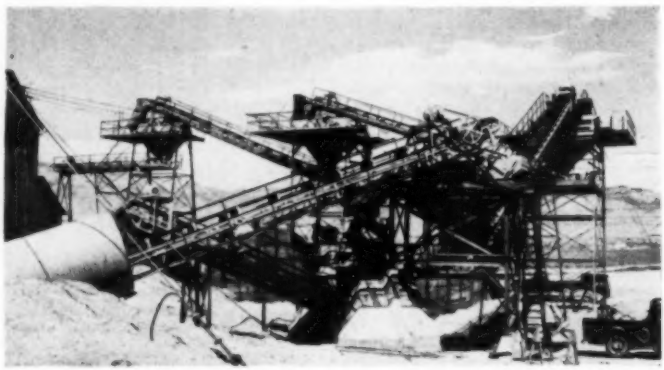
The minus ¼-in. undersize from these screens is carried on another 24-in. belt (60 ft. long) to the final sand-sizing screen—another 4- by 12-ft. single-deck Cedarapids machine. This has ⅛-in. cloth. By feeding it heavy a concrete sand can be made over this screen and a minus 6-mesh mortar sand through it. The former drops direct to a stockpile and the latter is carried on an 18-in. by 40-ft. conveyor to a separate pile.

The four stockpiles are located over a loading tunnel and each has a live storage capacity of 600 cu. yds. The tunnel is of arched multiplate construction on concrete footings and supporting sidewalls. The stockpiles are separated by bulkheads of 6- by 12-in. timbers supported by steel H-section columns and guy cables. The tunnel is 16 ft. wide, ample for trucks and a future collecting and blending conveyor, and has a concrete floor. There are three gates under each stockpile, so arranged that a gravel train, consisting of a 13-cu. yd. bottom-dump semi-trailer and a 13-cu. yd. bottom-dump 4-wheel trailer behind it, can be loaded at one stop. Extra gates are provided at one side for the future conveyor.

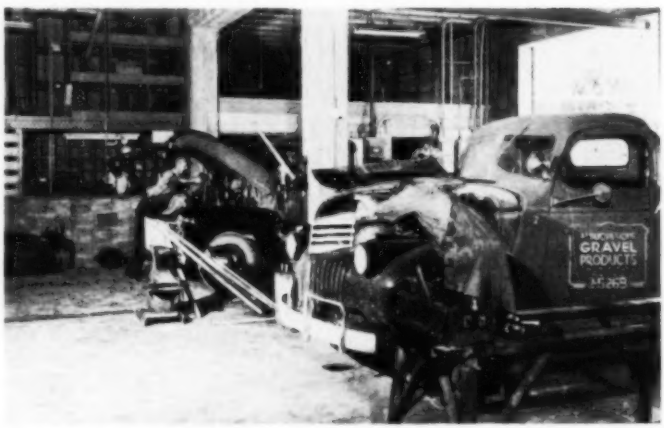
The plant was designed by Gordon Ferguson, local engineer-architect, from preliminary sketches by Mr. Sundt, who had looked over many plants in different parts of the country before going ahead with construction. The Iowa Manufacturing Company supplied all the belt conveyors and screens.

The electric power used is purchased at 4160 v. and is reduced to 440 v. for all plant motors. Total power demand is 450 hp. The entire system is interlocked. All starters except that for the scraper are in a separate building, and emergency stops are provided throughout the plant. The crusher has a low-pressure-oil alarm.

A new shop at the main yard is used for the maintenance of trucks and plant equipment. It houses, in addition to extensive truck-mixer-washing facilities, a grease pit, tire repair room, parts room, work stalls, lockers, showers, etc.



• Another view of the plant, with the conveyor from the receiving hopper to the scalping screen and the crusher.



• A typical scene in the new shop at the main yard, showing parts storage facilities (background) and men busy in the work stalls.

The Problem of Deleterious Particles In Aggregates[1]

By STANTON WALKER
director of engineering, and D. L. Bloem, assistant director, National Sand and Gravel Assn.

AMONG the more vexing problems of aggregate production is that presented by deleterious particles occurring as impurities in aggregate deposits. The problem is most pressing with respect to coarse aggregates, and our discussion will be directed principally to gravel. It involves the identification of deleterious materials, the quantities of them which may be permitted without undue damage to the end product, and how to eliminate them or reduce their quantity.

In general, if a source does not contain basically suitable material, there is little that can be done about it. While there are methods which can be applied to reduce the quantity of many undesirable particles, there is a quickly-reached limit beyond which such processing is neither economical nor practicable. Accordingly, there should be a good understanding of the effects of these impurities.

Deleterious particles are commonly named as soft fragments, thin and friable particles, shale, argillaceous sandstones and limestones, cherts, coated particles, thin and elongated particles, laminated particles, coal, lignite, and other materials depending upon impurities prevalent in the locality. These may be fairly satisfactorily classified in a few broad categories as:

(1) Soft and friable particles which are basically sound. Examples are certain porous sandstones with either a siliceous or calcareous binder, certain soft limestones and a miscellany of weathered rocks. Such materials do not change in volume greatly on wetting and drying or freezing and thawing.

(2) Soft and friable particles which are basically unsound, but which disintegrate with relatively little change in volume. Examples are a wide variety of shales, argillaceous and limonitic sandstones, ochres and, again, a miscellany of weathered rocks.

(3) Particles which are relatively hard and appear to be sound, but which change greatly in volume due to freezing in the presence of moisture and which, generally also, have a high coefficient of volume change due to temperature. Some of the porous cherts are examples. Others merge into the previous classifications including argillaceous sandstones and limestones, certain of the limonitic rocks and others.

(4) Laminated rocks, some of which may contain impurities such as clayey materials which change in volume in the presence of moisture. In other cases the laminations may be free of impurities but permit the intrusion of water which on freezing causes marked expansion.

(5) Certain rock types which alter and, or, react chemically with certain constituents of the cement.

(6) Obvious impurities such as coal, lignite, sticks, bark, mud balls, etc.

These categories may be further condensed, for the most part, into two general classifications: Those which break down with little volume change, and those which expand considerably and exert a disruptive force. These so-called deleterious particles are principally objectionable on account of their effects on the appearance and durability of concrete; their effects on strength, within the limits of any

(1) Presented at the 34th annual convention, The Stevens, week of January 23, 1950, Chicago, Ill.

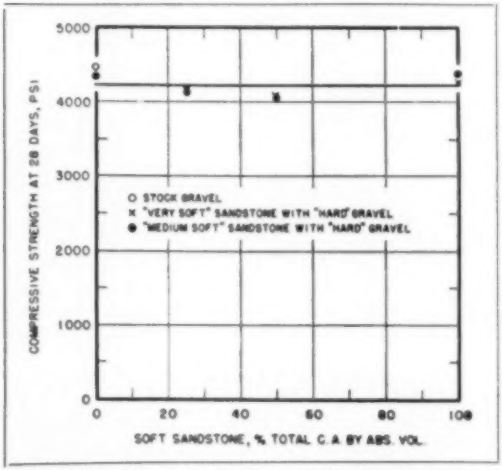


Figure 1. Effect of soft sandstone on compressive strength of concrete (Series 88).

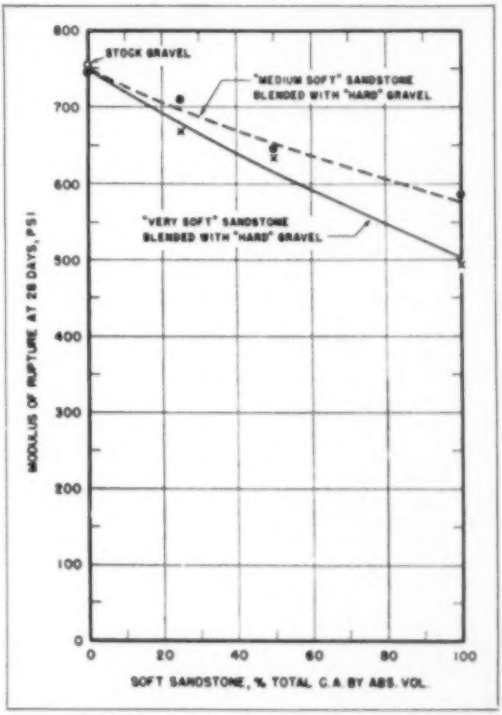


Figure 2. Effect of soft sandstone on flexural strength of concrete (Series 88).

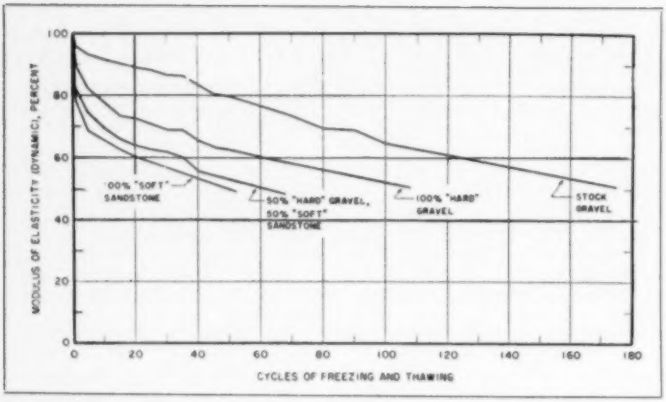


Figure 3. Effect of soft sandstone on resistance of concrete to freezing and thawing (Series 107).

quantity reasonably likely to be present, is measurable but of secondary importance.

The effect on appearance may be important. Unsightly staining, popouts, and pits certainly do not contribute to the acceptability of a bridge rail, a column, or other surfaces exposed to public scrutiny. As to durability, the harm is generally local in nature, but if a sufficiently high proportion of the objectionable particles is present, the local damages become continuous and may lead to progressive disintegration. Also, each point of local damage is a weak link for further attacks and for attacks on reinforcing steel.

Those impurities which react chemically with certain constituents of the cement, while important, are not common in the sense that they affect a large proportion of the members of the industry. They represent a special case which will not be discussed here, except in the broadest terms. They deserve more attention than can be given them in a general discussion of the problems of deleterious particles.

Identification

If the rock types referred to are to be studied from the point of view of effects, specification limits, or removal, they must be identified. The methods for such identification are not well defined. They require some knowledge of rocks and minerals in general—and the more, the better. They depend on visual examination, with or without magnification, supplemented by tests for strength, hardness, soundness, specific gravity, and absorption.

The soft and friable type of particle receives major emphasis. The identification of these involves judgment, guided by some arbitrary definitions. How soft must a particle be to be identified as "soft"? Most specifications place specific upper limits on the percentage of soft particles (for example, 32 of the 48 state highway departments). Others refer to soft particles in general terms, prohibiting excessive quantities. As a result of a comprehensive investigation of various methods of measuring hardness, D. O. Woolf of the Bureau of Public Roads developed a scratch test which shows promise of providing a reasonably acceptable line of distinction between hard and soft materials. His work was described in a paper presented before the annual meeting of the A.S.T.M. in Atlantic City in 1947.[2] The test recently has been adopted as a tentative method of the A.S.T.M. and will be published in the 1949 Book of Standards. It consists of scratching the particles with a "pencil" made of 1/16-in. yellow brass drill rod of a Rockwell hardness of about B 70. If, on scratching, aggregate adheres to the brass, the piece is soft. If, on the other hand, brass adheres to the aggregate, the piece is hard.

The soft and friable particles which are basically unsound may be identified visually from a knowledge of how they act, gained by observation in service and in the soundness test. Frequently, as in the case of many shales, such particles may be identified by observation of weathered stock piles or exposed faces in deposits.

The hard and sound-appearing rocks, which cause trouble, offer the most opportunity for differences of opinion. Frequently they do not lend themselves to diagnosis by conventional soundness tests, since they may withstand such tests satisfactorily. Also, their behavior in service may be erratic. Identical types of particles may behave well in some cases and poorly in others, depending, generally, on moisture conditions. Informed and objective judgment is required for their identification—and even then there are uncertainties.

As already stated, the "chemically reactive" rocks present a special case. Their identification requires special procedures and skilled laboratory technicians—and, again, there are uncertainties. The only unqualified identifications which can be made of materials commonly classified as deleterious are for coal, lignite, sticks, and the like.

Effects of Deleterious Particles

It is difficult to study the effects of deleterious particles in a quantitative fashion either in the field or in the laboratory. As already pointed out, strength is relatively unaffected. Effects on durability and appearance are localized and not readily measured.

The association, at its Research Foundation at the University of Maryland, has conducted a number of investigations in this field, both as to effects and as to methods of measuring effects. One of these investigations consisted of freezing and thawing of concrete made with gravels used by Mr. Woolf of the Bureau of Public Roads in his study leading to a method for identifying soft particles, to which reference has already been made. No satisfactory correlation was found between the results of our freezing and thawing tests and the percentages of soft particles determined by Mr. Woolf. While this was a disappointing outcome, on review, it was not a surprising one. The gravels tested were from widely separated sources. The qualities of the soft particles varied so much, and the qualities of the parent gravels varied so much, that the effects of the soft particles *per se* were masked.

Two investigations of soft particles carried out at the association's Research Foundation have yielded reasonably quantitative results. They involved two gravels from different and widely separated sources. In each case the producer furnished materials which had been handpicked to separate the soft particles from the parent materials. In these tests, the soft particles were re-

(*Continued on page* 163)

2 *Methods for the Determination of Soft Pieces in Aggregates*, by D. O. Woolf, *Proceedings*, American Society for Testing Materials, Vol. 47, 1947, p. 967.

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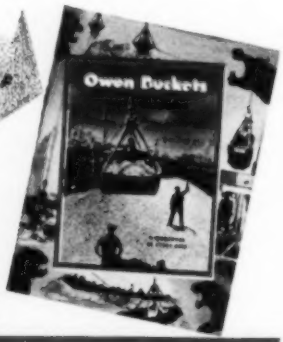

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National Gypsum Anticipates High Level of Activity in 1950

The National Gypsum Company expects to keep production in its plants at present high levels throughout the first half of 1950, President Melvin H. Baker said in the annual report to stockholders.

"Most of our plants are carrying a fair backlog of unshipped business and sales for the first two months of this year were substantially ahead of last year," he declared.

The company's 1949 net profit of $5,836,707, was equal to $2.57 a common share. This compared with $7,997,976, or $3.60 a share, in 1948. Sales of $59,439,883 in 1949 compared with 1948's record high of $68,125,235. Mr. Baker said $1,300,000 of the $8,685,352 drop in sales resulted from reductions in prices.

Biggest Ever Freight Bill Paid By—You Guessed It—Texans

Limestone Products Company officials at Cleburne, Tex., had to pay a big freight bill the other day—$2,181.55, plus tax—on a carload of new equipment. This sum is believed to have been the largest such freight bill ever paid on a single carload of freight to arrive in Cleburne. But Texans specialize in superlatives—they probably didn't bat an eye.

Contents of the expensive carload included parts for a big dry kiln to be installed at the plant. This kiln is a portion of a $500,000 expansion and improvement program currently in progress at Limestone Products.

Liberty Limestone Corp. Plant Suffers Heavy Fire Damage

On March 28 fire damaged the Liberty Limestone Corporation's facilities at Buchanan, Va., to the extent of $75,000, or possibly $100,000. The cause of the fire was not immediately ascertained.

According to J. L. Teaford, vice-president and treasurer, rebuilding is to be started at once. Mr. Teaford stated that operations at the plant will continue on a 24-hour-per-day schedule.

Coronet Phosphate Moves Mining Operation to New Site

B. G. Dabney, vice-president of the Coronet Phosphate Company of Plant City, Fla., recently announced that the firm will move its mining operations from Hillsborough County to a 3000-acre site 6 miles northeast which is to be called Tenoroc—Coronet spelled in reverse. Mr. Dabney indicated that actual operations will begin at the new site in 1951, and that between 65 and 70 men will be employed.

For transportation the company will have access to the Seaboard Air Line Railroad via a spur being constructed from the main line. Material will be shipped from the new mine to Coronet's processing and shipping plant at Plant City.

Deleterious Particles

(*From page* 160)

combined with the parent materials in controlled percentages. The data have been reported in N. S. G. A. Technical Information Letters No. 50 and 72. See figures 1 to 4.

Figure 1 shows effects of controlled percentages of soft particles on compressive strength. The soft particles consisted almost entirely of sandstone picked from the gravel, which itself contained considerable quantities of hard sandstone. The soft sandstone had a specific gravity, saturated surface dry, of 2.47 to 2.49, an absorption of 2.5 to 2.8 (3.9 to 4.3 when vacuum saturated), a loss in the Los Angeles abrasion test of 67 to 74 percent and a loss in five cycles of the sodium sulphate test of from 9 to 13 percent. These values are to be compared with the following for the parent gravel, exclusive of the soft sandstone: specific gravity, s.s.d., 2.59; absorption at 24 hours, 1.3 percent; absorption under vacuum, 1.8 percent; percent loss in Los Angeles test, 31.7 percent; sodium sulphate loss, 1.6 percent. It will be seen that, in spite of these wide differences between the two materials, the compressive strength was substantially unaffected.

Figue 2, taken from the same investigation, shows that, unlike compressive strength, the flexural strength was materially reduced by replacement of hard gravel with the soft sandstone. The reduction amounted to about 0.2 percent for each percent of "medium soft" and 0.35 percent for each percent of "very soft" sandstone. While the effect was appreciable, it can be seen that this particular soft material could be present in quite large quantities without causing excessively larger sacrifices in flexural strength. For example, the presence of 10 percent of even the "very soft" material would be expected to reduce flexural strength by less than 4 percent. Very few specifications would permit as much as 10 percent of soft particles.

Figure 3 shows the effect of these same soft sandstones on resistance of concrete to freezing and thawing. were not excessive. Concrete containing 100 percent of the hard parent material withstood 108 cycles, whereas that containing 100 percent soft sandstone withstood 52 cycles before a loss in dynamic E of 50 percent. Previous experience indicates that ability of non-air-entraining concrete to withstand 50 cycles of this severe test is evidence of satisfactorily durable aggregate. Therefore, the presence of this particular soft material in reasonable quantities would not be likely seriously to reduce the overall resistance of concrete to freezing and thawing. As indicated earlier, this type of soft particle may mar the appearance of a structure even though the overall integrity of the concrete is not seriously damaged.

Figure 4 summarizes another group of tests on hand-picked gravel (from another part of the country than that just discussed) showing

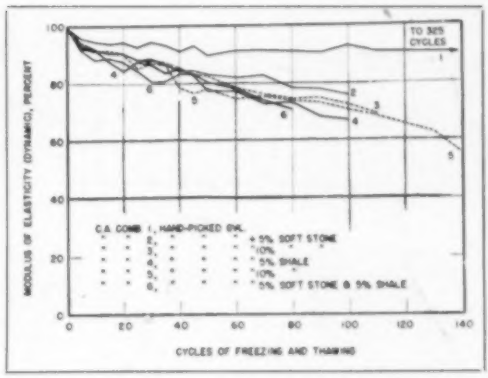

Figure 4. Effect of soft stone and shale in gravel (Series 568). (Gravel vacuum-saturated; cement factor, 5.5 Sk./cu. yd.).

the effects on resistance to freezing and thawing of 5 and 10 percent of "soft stone," 5 and 10 percent of "shale" and 5 percent of each of these. The "soft stone" was predominantly soft sandstone. The "shale" might be described as a "clayey sandstone" or perhaps as a "sandy shale."

In this case there were somewhat greater differences between specific gravity, absorption, etc., than for the other tests. The hand-picked gravel had a bulk specific gravity, saturated surface dry, of 2.63, as compared with 2.46 for the soft stone and 2.49 for the shale. Twenty-four-hour absorptions for the parent gravel was 1.1 for the soft stone, 5.1 and for the shale, 4.8. Absorptions under vacuum were 1.2, 6.4 and 6.0, respectively. After ten cycles of the magnesium sulphate test, the parent gravel showed a loss of 5.8 percent, as compared with 63 percent for the soft stone and 81 percent for the shale. While ten cycles of the magnesium sulphate test are not directly comparable with five cycles of the sodium sulphate test, reported for the previously described investigation, it is evident that the soft stone and the shale in this group of tests are much less resistant than the sandstone in the preceding group.

As might be expected from the indications of poorer quality just cited, the soft stone and shale in this investigation caused more marked reductions in resistance to freezing and thawing than did the other soft sandstones. Concrete made with hard gravel withstood 325 cycles with a reduction in dynamic modulus of only about 10 percent. That suggests that this parent material may have been more resistant to freezing and thawing

(*Continued on page* 168)

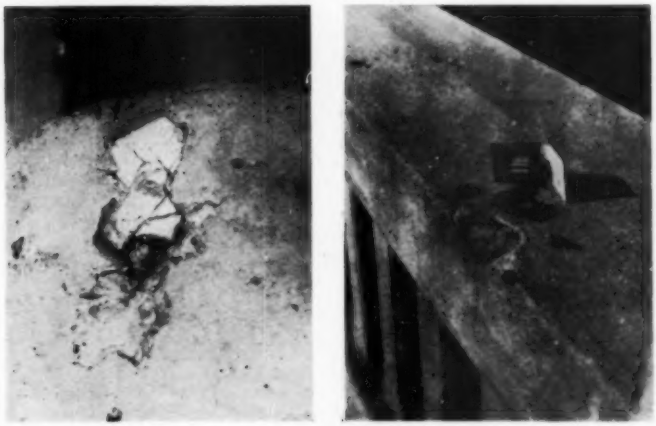

Figure 5. Pop-outs in concrete caused by unsound particles.

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General Refractories Buys Austrian Magnesite Firm

General Refractories Company announces that it has entered into a contract to purchase all of the outstanding capital stock of the American-Austrian Magnesite Corporation of Pittsburgh, Pa., from Dwight Winter and the estate of the late Emil Winter. This corporation owns all of the stock of Austro-American Magnesite Company, an Austrian corporation, which owns and operates magnesite deposits and a refractory brick plant near Radenthein, Austria.

Floyd L. Greene, president of General Refractories Company, states that this acquisition . . . will enable the company to apply its American patents, processes and know-how in the most important field of specialized refractory production outside the United States.

4 Portland Cement Plants Send Men to Safety Session

Representatives of four portland cement plants met recently at LaSalle, Ill., at the ninth of 21 regional safety meetings sponsored this spring by the Portland Cement Association. Presiding as general chairman was E. F. Brownstead, general superintendent, western division, Alpha Portland Cement Company, St. Louis, Mo.

Portland cement manufacturing plants represented were the Alpha plant at LaSalle; mills of the Lehigh Portland Cement Company and the Marquette Cement Manufacturing Company, both of Oglesby, Ill.; and Medusa Portland Cement Company of Dixon, Ill.

The program included an analysis of cement plant accidents and their causes. During a discussion suggestions were received for eliminating such accidents. Safe driving was stressed, and slides on accident prevention were presented. Also shown was the sound-color movie *The Drama of Portland Cement*.

Among those who attended the meeting were plant managers, superintendents, safety directors, mill foremen, quarry foremen, and members of plant safety committees. Representing the Portland Cement Association was I. F. LeGore, assistant manager, Accident Prevention Bureau, Portland Cement Association, Chicago.

Missouri Quarry to Reopen After Seven-Year Shut-Down

O. E. Wegener, owner of the O'Fallon Quarry near O'Fallon, Mo., recently announced that the site had been leased to E. W. Hillenkamp and Warren Buescher, who will begin operations there soon. Mr. Wegener operated the quarry for about 20 years ago, but suspended operations in 1943.

First job of the new operators will be to drain the lake which has formed in the quarry. The business will be operated under the name of the O'Fallon Quarry and Supply Company, Inc.

More Information, Please

CHECK AND MAIL THE CARD BELOW FOR ADDITIONAL INFORMATION ON NEW MACHINERY AND SUPPLIES

1. Warren Announces Plastilube. Folder presenting "an all-purpose, non-melting lubricant." Contains photographs and account of test performed to show the non-melting quality of the product; also particulars of test for metal adhesiveness and water resistance. The Warren Refining & Chemical Co.

2. Littleford "Kwik-Steam" Vapor Generators. Bulletin AA-22. Introducing a unit for rapid generating of steam for operations such as ready-mixed concrete plants, concrete products plants (curing), pile driving, asphalt plants, etc. Cutaway and closeups, as well as illustrations of actual installations, accompany the data, tables, and specifications. Littleford Bros., Inc.

3. Faster, Cheaper Digging & Loading with Your International I-6 and ID-6 Industrial Wheel Tractor. 4-page bulletin featuring the Marmach loader. Photographs illustrate various applications for the machine. Advantages and special characteristics are listed and specifications are given. Marion Machine Co., Inc.

4. PneuBin Solves the Problem. A condensed folder which tells what PneuBin is, what it does, its main features, and its advantages. Typical uses for this bin-feeding device also are listed. Gerotor May Corp.

5. Hard-N-Deep Steel Hardening Compound and Harden Steel with Hard-N-Deep. The first is a bulletin which shows the steps for using this compound by color sketches. The second, a pocket-size folder, explains what it is, where to use it, and what advantages it offers. Also contains information for obtaining best results in using it. The Mircoalcy Corp.

6. The Feedoweight Gives the Answer When Feeding Proportioning or Batching. 12-page bulletin listing users of the Feedoweight and the application to which each unit is put. Merrick Scale Mfg. Co.

7. Little Giant Cranes. 20-page, 2-color bulletin describing a unit which can be used as a shovel, clamshell, dragline, crane, trench hoe, and electric magnet. Each of these applications is pictured and described. Pertinent data and a table of specifications are given for each type of unit. Des Moines Dragline Service.

8. The Humphreys Spiral Concentrator Closed Circuit Test Unit—Manual of Operating Instructions. Bulletin No. 10. Contains detailed data on the design, operation, and performance of this device, together with information on various tests. Illustrated with outline drawings, photographs, and graphs. The Humphreys Investment Co., Engineering Division.

9. The Murphy Unit Fuel Injector and Murphy Diesel Power for All Industries. In the first bulletin special advantages and characteristics are listed, and design and operation data are given. A cutaway keyed sketch of the device illustrates how it works, and a table of specifications is included. The second is a picture-story folder telling the stories of 15 typical applications of Murphy units in industry. Murphy Diesel Co.

10. Bulldog Hammermills. 8-page bulletin containing the background of the firm which builds the mills, as well as engineering information, suggested applications, and special features. Illustrated with photographs and sectional sketches. Hammermills, Inc.

11. The Hossfeld Direct Motor Drive Rock Drill and Economical Drilling. The first is a keyed wall chart containing also useful information on the range of uses of the drill, features of its design and operation, advantages, and other relevant data. The second, an attractive booklet, sketches the history of the device, enlarges upon the advantages, and contains testimonials from users; also shows several photographs of the drill in actual use. Hossfeld Mfg. Co.

12. Clement Dump Trailers, with insert. Special operating and design features are presented in picture form in the folder; the insert contains more detailed information on all important parts of the trailer. Winch-Lift Inc.

13. The Dorco Type W Pump. Bulletin 5001. An outline of the construction features of this unit is supplemented by a keyed line drawing and photographs. Advantages are listed and described. The Dorr Company, Engineers.

14. Steps to More Profit from a Bag of Cement. Pocket-size illustrated folder giving necessary information for handling forms used in the production of precast Homeward Steps. Roger F. Williams Co.

15. Prefabricated Package Plants. Gives full information on the H. H. Sink and Float heavy-media separation process, including capacity, general description, operational features, installation, and shipment. The Sink and Float Corporation.

16. Bailey Fluid Meters for Steam, Liquids, Gases. Bulletin 301-B. The following topics are covered: value of fluid meters; how to use the bulletin; indicating, recording and integrating combinations; flow mechanisms; the integrator; auxiliary recorders; primary elements; accessories; installation; requesting information; etc. Fully illustrated with photographs, sectional sketches, and graphs. Bailey Meter Co.

17. Kimco Rocker Shovel 104. Bulletin No. L1019. Economy features in speed, power, simplicity, design, dependability, maintenance, and investment are discussed and recommended. A list of specifications accompanies the sectional sketch. The Kimco Corporation.

18. Lincoln Heavy Duty Lubricating Systems for Contractors. Catalog 50. 8-page bulletin with price list. All products of this line, including accessories, are illustrated and fully described. Lincoln Engineering Co.

19. Facts for Business Policy. A folder presenting the services of a staff of consulting experts qualified to handle business and industrial problems. Examples of the various types of service supplied

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by the firm are given. Arthur D. Little, Inc.

20. Link-Belt Gearmotors. Book No. 1815-A. Topics covered: gearmotor selection, tables of load classification, selection, overhung loads, dimensions for Type DM (double reduction) and Type TM (triple reduction), slide rails for gearmotors, and other Link-Belt power transmission units. Complete price list is included. Link-Belt Co.

21. American 25-Ton Diesdectric Locomotive Crane. Catalog No. 600L-8. A presentation of the Model 825DE, describing and picturing this device, and including specifications. American Hoist and Derrick Co.

22. A-C Solids Pumps. Presents full information on the Type CW solids pump, applicable in handling sand, gravel, rock products, cement, gypsum, dredge water, dolomite, bauxite, and similar materials. Table of dimensions included. Allis-Chalmers Mfg. Co.

23. Joy WL-80 Unitair Compressor Bulletin. No. A-56. Contains an easy-to-use selector chart and detailed sectional drawings and closeup photographs of parts. Joy Mfg. Co.

24. Circular JE-1148, containing complete data on Thor "Copper Line" tools, including Thor ¼-in. and ½-in. drills; Circular JE-1139 describes the Thor Model 35 sinker rock drill, with tool specifications and cutaway drawings; Circular JE-1132 catalogs four Thor mining tools—a new sinker leg, an air bar feed, a pneumatic column, and a stoper leg. Independent Pneumatic Tool Co.

25. Bulletin No. 51. Presents a high-speed, non-blinding vibrating screen for materials such as agricultural limestone. The Deister Machine Co.

26. Specialized Testing and Measuring Equipment Catalog. Gives information on more than 90 modern equipments for specialized testing and measuring. Random topics covered follow: magnetic equipment; force, strain, and thickness gauges; color, light, and spectro equipment; materials testing equipment; vibration, sound, and balancing equipment. General Electric Co.

27. Sturtevant Whirlwind Centrifugal Separator. Bulletin No. 087. Contains information on the design, uses, operation, capacity, and performance of this separator. A phantom view shows how the device operates. Sturtevant Mill Co.

28. Lumnite Refractory Concrete. Revised and reprinted. Furnishes latest available information on refractory and heat-resistant concrete. It is called a manual of how-to-do-it information. Contains detailed information on refractory concrete mixes—proportions of Lumnite and various aggregates. Tables for selecting proper types of refractory concrete are included. Lumnite Division, Universal Atlas Cement Company.

29. Bulletin A-470. 16-page brochure presenting the complete story of the Dodge Torque-Arm Speed Reducer. Includes information for selecting proper size reducer for a given application and tables for determining size of V-belts. Dodge Mfg. Corp.

30. Jaw Crushers—Series 10. Bulletin BM-10. 8-page booklet featuring the Gruendler Series 10 jaw crusher. A description and an illustration of each model is given, as well as a list of specifications and a percentage chart for determining crusher settings. Gruendler Crusher & Pulverizer Co.

31. New Automatic Schmidgall Block Fork. Flier which pictures and describes this palletless block-handling device. Contains table of specifications. Schmidgall Mfg. Co.

32. Denver Pulp Density Scale Tables, Bulletin 8-1-C-B and Bulletin 8-1-C-B1. The former covers pulps ranging from 5 percent solids at specific gravity 1.40 through pulps of 68 percent solids at specific gravity 3.20. The latter covers the low-range specific gravity pulps from 5 percent solids at specific gravity 1.35 through pulps of 68 percent solids at specific gravity 1.85. The scale is described, and pulp density tables are given, alone with pulp density formulas. Denver Equipment Co.

33. Ducloss Collectors. 12-pages. A catalog of collectors for industrial dust control. Describes construction and operating features; illustrated with graphs of efficiency curves, schematic drawings of various industrial applications, etc. The Ducon Company.

34. New Proportioning Bulletin. Describes a new proportioning and blending system incorporating the Conveyometer, a self-testing Feeder-Weigher for stream delivery of small, crushed, granular or non-flushing, ground materials. Richardson Scale Co.

35. Syntron Vibratory Feeders. Bulletin on the line of Syntron Vibra-Flow vibratory feeders, long conveyors, multiple magnet models, furnace feeders, infrared feeders, and other equipment. Syntron Company.

36. Cleveland Worm Gear Vertical Speed Reducers. Bulletin 125. Presents the new Types NU and ND reducers. Cutaway views, graphs, line drawings, and tables of data supplement the explanatory text. The Cleveland Worm & Gear Co.

37. Eveready Brikhaw. Various uses listed and illustrated: concrete block fire brick, glass block, face brick, glass tile, etc. Engineered features are explained, and the principle of operation is presented pictorially. Eveready Brikhaw Co.

38. N-B-M Tiger Bronze. Announces an expanded line of cored and solid Tiger bronze bars, both rough and machined. Lists sizes and weights of bars, shows physical properties of Tiger bronze, and describes its uses and advantages. National Bearing Division, American Brake Shoe Co.

39. Catalog No. 2506. Provides detailed information on the new Valmont Type S dust collector and the standard Type HC. Includes a nomograph chart for determining the number of tubes required for a given capacity, temperature and resistance; also tables for determining dimensions of the collector for any number of required tubes. Prat-Daniel Corp.

40. Lincoln Electric Service Directory. Listing of 164 Lincoln authorized field service shops in cities of 44 different states, offering a welder parts exchange plan. Directory also includes a complete price list for exchange parts. Lincoln Electric Company.

41. Super-Duty Hypressure Jenny Steam Cleaner and Process Heat Generator. A presentation of a unit for double service—for cleaning jobs in construction work, truck operation, etc., and for curing concrete units and thawing purposes. Special features are listed. Homestead Valve Mfg. Co., Hypressure Jenny Div.

42. The Best Drain Tile in the World Is Made on the Ace. 8-page bulletin addressed to concrete products manufacturers. Useful information on markets, full data on the construction features of the Ace tile machine, and sample estimates of profits are included. Dugas & Co.

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Figure 6. Staining resulting from an unsound particle.

Figure 7. Cracking in a bridge structure attributed to alkali-aggregate reaction.

Deleterious Particles

(*From page* 163)

than that shown in Figure 3; however, the two groups of tests were made three or four years apart, and other conditions may have caused the difference. The addition of only 5 or 10 percent of either the soft stone or shale to this highly resistant material resulted in the dynamic modulus being reduced to about 75 percent in only 100 cycles. In comparing these results with the effects of the soft sandstone it must be remembered that the sharp reduction in durability in this case resulted from use of relatively small percentages of the deleterious substances. This suggests that these materials may cause deep-seated deterioration and unsightly marring.

Mention was made of relatively hard stones which changed greatly in volume and which caused "pop-outs." Two examples of such disintegration are shown in Figure 5, taken from a paper presented before this association in 1938 by R. R. Litehiser, chief engineer of tests of the Ohio State Highway Department and reprinted as our *Circular 16, The Effect of Deleterious Materials in Aggregates for Concrete.* Mention was also made of unsightly staining which may occur; and Figure 6 is an illustration, again from the paper by Mr. Litehiser.

As already pointed out "reactive aggregates" will not be discussed. However, it may be of interest to show Figure 7, as illustrating a type of failure which has been attributed to chemical reactions between certain constituents of the cement and of the aggregate.

Removal of Deleterious Particles

What about the feasibility of eliminating or reducing the quantity of deleterious particles? Various attempts have been made with only moderately encouraging results. It is self-evident that processing to separate selected types of particles from the parent gravel must depend on differences in strength and hardness or in weight or—to a limited extent—in size and appearance, or combinations of all of these. In what follows the principle of the several procedures which are used, or have been tried, will be mentioned briefly for the purpose of encouraging floor discussion.

Our information on the various attempts to eliminate deleterious particles is quite general and somewhat casual. Opportunity has not been had to make a thorough survey of the information which is available. However, it is hoped that the mere introduction of the subject, and its discussion in general terms, will be of interest and of value. At any rate, this session, sponsored by the Committee on Operating Problems, is an appropriate place to bring up the subject, with the hope of arousing more authoritative discussion from the floor.

Very soft particles, such as mud balls and some loosely consolidated conglomerates, may be removed or reduced in quantity satisfactorily by processing through log washers and scrubbers. At least one example can be cited, for a deposit with the sand and gravel completely embedded in clay, where a very high content of sticky clay is removed satisfactorily by log washers. In another case, not personally inspected, it is claimed that a modified log washer is doing a good job in removing "sugar" quartz. Numerous examples of fairly satisfactory removal of mud balls and the like by scrubbers of various types can be cited. In general, only the simplest of scrubbers are used in the industry.

Particles such as those just discussed, while soft, do not fall in the category of those commonly identified as soft. The common category suggests separation by differences in hardness, which has led to the use of various types of impact crushers and "soft stone eliminators." These have been used with varying success, depending upon the material to be processed. Their use introduces additional problems:

(a) Inevitably, a bottle neck in the flow sheet is produced.

(b) What shall be done with the crushed soft materials? Shall they be permitted to go into the sand? In many cases that probably would not be harmful, but, in others it might.

(c) The quantity of soft materials cannot be reduced satisfactorily without at the same time breaking up considerable quantities of good materials.

(d) Maintenance costs of equipment are generally high. There are a number present who can discuss this type of operation from first-hand experience.

Before leaving the subject of impact it should not be overlooked that any crushing and allied processing,

type of crushing will be beneficial in the reduction in quantity of soft particles in the coarser sizes.

Separation on the basis of weight has been little used in the gravel industry. Some simple jigs have been used to separate coal, lignite, sticks, etc. Mention of the use of jigs for removal of shale and soft stone has been seen in the literature, but we recall no first-hand information on such operations. Jigs require a greater difference in weight than generally exists between the parent gravel and the material which it is wished to remove, except for such materials as coal, sticks, etc. where they may be used quite effectively.

Heavy media separation (i.e. sink-float), developed in the mining industry within the last 15 years, has been suggested as a procedure for making separation of materials differing little in specific gravity. It is claimed that a range in specific gravity of as little as 0.02 makes separation feasible and that for a range of 0.05, "separation could be made quite readily," to quote a representative of the American Cyanamid Company at our 1944 annual meeting.

In principle the process consists of floating out the lightweight material on a heavy "liquid" which is formed by a suspension of heavy materials such as sand, magnetite, galena or ferrosilicon in water. Quartz sand suspensions have been used for cleaning coal for many years—the Chance process. Maximum specific gravity obtainable with sand, according to Taggart, is only about 1.8, which, of course, would not be applicable to aggregate processing. Again, according to Taggart, magnetite will provide suspensions of specific gravities up to 2.55, galena up to about 3.3 for normal working conditions, and ferrosilicon also up to about 3.3.

Modern heavy-media processes employing ferrosilicon, galena or magnetite have been used, quite widely we understand, in processing low-grade iron ore, cleaning coal, and concentrating zinc, feldspar, magnetite, manganese and other ores. So far as has come to our attention, there has been only one field experience with it in processing gravel. That was described in the April, 1949, issue of the *Engineering Journal* (the Journal of the Engineering Institute of Canada) and the December, 1949, issue of PIT AND QUARRY. The article describes separation of gravel for use in concrete in the construction of airport runways at Rivers, Manitoba, Canada. The gravel contained considerable quantities of shale and rotten granite, and it is said that a satisfactory separation was made at an estimated operating cost of about 10 cents per cu. yd. It appears that this figure does not include plant "write-off" or any royalty payments.

Some experimental work has been done with gravel in the laboratories of the American Cyanamid Company of Stamford, Conn. Developments in this field should be watched closely.

Mention was made of separation based on size. Of course, the most obvious example is the removal of silt and clay, principally applicable to the sand sizes. However, to continue to restrict our discussion to coarse aggregate, there are cases where the undesirable impurities are concentrated in either the coarser or finer sizes. As one example, we have in mind a river gravel in which the soft sandstone particles predominate in the larger sizes. Obviously, their quantity in the finished aggregate can be reduced by scalping and wasting more of the larger size.

The efficacy of hand-picking methods should not be overlooked. "Belt pickers" are familiar to most of the industry. Commonly, no more special provision is made than to provide a place for a man to stand or sit where he can reach the moving belt. Sometimes a picking table, in the form of a widened and slowed-down section of belt is provided. More elaborate devices are available, but not commonly used in sand and gravel processing. A good job can be done in the removal of certain impurities (clay, chert, large pieces of rotten stone, etc.), by alert workmen. However, the job is monotonous and soporific. Recently the senior author went, with a vice-president of a company, into a large efficiently operated plant and saw the belt pickers fast asleep! Procedures involving less of the human element are to be desired.

Closure

It is probable that the majority of aggregate producers have at one time or other come up against the problem of deleterious particles in aggregates. The number of different types which may be encountered is so large that only a fortunate few work with deposits which are entirely free of them. It has been the purpose of this paper: first, to classify deleterious substances in terms of their physical characteristics and effects on concrete; second, to review briefly methods of identification; and third, to discuss methods which have been or may be employed for their elimination. It is hoped that more light will be shed on the problem through discussion of the paper by producers who have had to meet this problem.

Crushing-Screening Lubrication

(*From page* 153)

sure gun inlets at two points.

Loads on eccentric bearings are often comparable with loads on the pitman bearings. This will be especially true if the weight of the pitman is not balanced by springs, in which case the full weight will be exerted upon the eccentric bearings.

Lubrication of toggle seats also is dependent upon design. As rolling motion is developed, the duty imposed upon the lubricant is less severe. Some sliding motion will always prevail, however, so these mechanisms should not be overlooked. Usually a relatively heavy oil will suffice, being applied by sight feed oil cups.

New Training Film on Safety Glasses Issued by N.S.C.

A new safety training film which should convince the most skeptical workman that it's smart to wear safety glasses has just been released by the National Safety Council.

Titled *Easy on the Eyes*, the film shows what glasses are best for specific jobs and presents case histories of injured workers and the dramatic testimony of blind persons.

Easy on the Eyes is available from the National Safety Council in the usual 35 mm. sound slidefilm, but it also is offered in a new form for 16 mm. sound-motion projectors.

Basic Refractories Personnel To Get Information Service

Slanted to the attainment of a better-informed staff at each Basic Refractories plant is the plan for expanding the company's educational program by mailing a wider variety of informative literature to employees' homes.

Into the mail will go, in addition to President Eels' Newsletter, annual financial reports, health and safety brochures, economic data, etc. Concurrently information of interest to Basic Refractories personnel will be published in the company news sheet, *Basic Blast;* and bulletin boards, library and conference rooms will be employed to "keep Basic employees the best informed in the business," according to the April issue of the *Blast*.

Effective May 1, 1950, the location of National Safety Council headquarters offices will be 425 N. Michigan Avenue, Chicago 11, Ill.

One-Man Drill Rig Cuts Cost At Wisconsin Agstone Plant

Until very recently all drilling at a small agricultural limestone quarry near Watertown, Wis., was done by two men with 45- and 55-lb. hand-held sinkers. As operations expanded, hand drilling became too cumbersome and expensive, and as a consequence the quarry operators, Ed and Gene Brunt, replaced the hand-held sinkers with a new light wagon drill.

The unit now sinking blast holes at this quarry is known as the "Mobildrill." Developed by the Le Roi Company of Milwaukee, the Mobildrill consists of a swinging boom which extends out from a "Tractair" platform (Le Roi's tractor-mounted compressor), and a universally-mounted wagon drill guide shell for 6-ft. steel change.

Drilling speed is said to be close to a foot per minute. At the Watertown quarry a blasting pattern is followed which requires 10-ft. holes spaced 2 ft. apart. With this pattern, five holes can be drilled at one placement of the Tractair by utilizing the swinging boom. Sinking a 10-ft. hole required about 10 minutes. One minute was required to drill the first 6 ft.; ½ minute to clean the hole, withdraw the steel, and change to a 12 ft. steel; 5 minutes to drill the last 4 ft.; and about one minute to change steel, plug the hole, and swing the boom to the next position. During two hours, the Tractair Mobildrill sank 96 ft. of hole, equalling an entire day's production by former hand-held sinker methods.

The Mobildrill is said to be flexible enough to drill angle, vertical or horizontal holes at any elevation. The swinging boom may be powered with an air motor. One can handle every phase of drilling, including the moving of equipment between drilling locations and blasting sites.

The 35-hp. tractor is capable of operating over rough terrain and eliminates the need for trucks or extra help to move wagon drill and compressor. It has four forward speeds ranging up to 12 m.p.h. and a reverse gear.

Drill, blow and feed controls are centrally located at the guide shell. The Le Roi-Cleveland type piston feed is said to have a steady cushioning feed which is effective in faulting ground and with carbide insert bits.

With truck-mounted Mobildrills, where 160c.f.m compressor capacity is available, a heavier 80-lb-class sinker may be used.

Pennsylvania Perlite Plant To Triple Present Capacity

An extensive modernization program said to involve the expenditure of $100,000 is currently being undertaken by the Perlite Manufacturing Company of Carnegie, Pa.

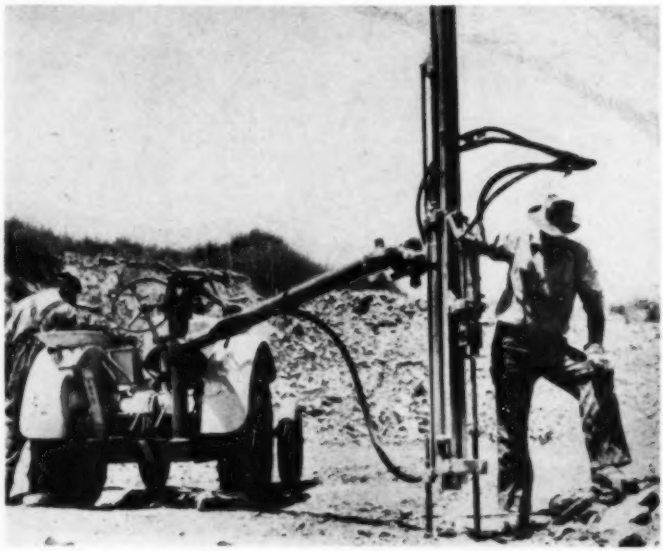
According to T. C. Ward, president, the project includes the installation of conveyor systems, bins, and an additional furnace. It is expected that the capacity of the plant will be tripled by the improvements. Raw perlite will be processed at the rate of two tons per hour.

During the last year the output of this plant has been used in more than 1200 homes and apartment building in the Pittsburgh area. Raw material—PerAleX—been supplied by the AleXitE Division of the Alexander Film Company, Colorado Springs, Colo.

Sulphur Output Maintains High Level During 1949

The domestic sulphur industry produced 392,655 long tons of native sulphur during the month of December, according to reports of producers to the U. S. Bureau of Mines. Production of 4,745,014 long tons during the year 1949 was only slightly less than in the record year of 1948.

Apparent sales during the month were calculated at 408,215 long tons, and the total for the year was 4,870,723 long tons. Producers' stocks totaled 3,099,305 long tons at the end of the year.



• Drill attached to a tractor-mounted compressor sinks a hole in the quarry floor.

• Below, left: Drill and swinging boom in position for moving to new location.

• Below, right: Drilling a horizontal hole.

✓ in Dredging — it's the solids pumped — that counts!

Above: E. T. Slider Co., Louisville, Ky., Ohio River dredge No. 5 equipped with 15"—75' heavy duty "Swintek." Double side braced for heavy river bar dredging conditions. This highly sucessful producer has used "Swinteks" for nearly 20 years.

Eagle "Swintek" Dredging Ladders *get* the Solids!

YOU can't sell water—it costs money to pump it—it's the sand and gravel intake that counts. Put an Eagle "Swintek" unit on your dredge and watch the ratio of solids to water zoom up! The digging chain passes over an arcuate track at the end of the dredge ladder, hugging the intake nozzle, shielding it against boulders and logs—prevents clogging and abuse to pumps. The cutters chop loose impacted aggregate and get it into suspension so the pump can "do its stuff." Clay and silt are churned away from pumping zone. An even flow of material to shore plant is assured.

It is not uncommon to increase dredge output 400% or more. Many dredging operations that were in the red have been put into the profit column for keeps by installation of a "Swintek." **CHALLENGE** that statement—we would like to prove it to you. See an installation—send for Catalog 745.

At Left: Special lightweight 60' Eagle ladder increased output 400% for Penn Jersey Sand & Gravel Co., Bridgeport, N. J.—average over 150-tons per hour, using 6" pump.

By installing an 8"-45' Heavy Duty Eagle "Swintek," Bowersock Sand Co., Lawrence Kan., doubled production, cut through clay strata to reach virgin sand, keep rocks out of line. "Sorry they did not buy it sooner."

SINCE 1872 Progress...Service

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personal mention

L. P. Struble

Promotion of LOUIS P. STRUBLE JR. to the position of general manager of its Keystone Division has been announced by the board of directors of Dravo Corporation, Pittsburgh. He succeeds William E. Clark, who has been made general manager of the firm's Engineering Works Division.

Mr. Struble became associated with Dravo in 1935. His first assignment was that of engineer on the construction of the dam at Gallipolis, O. For a number of years he worked for the Engineering Works Division in the boatyard, repair shop, and sales department. He was assistant purchasing agent from 1939 to 1942. During the World War II he became materials superintendent.

Since July, 1945, Mr. Struble has been distribution manager of the Keystone Division. He also has served as a member of Dravo's Junior Board of Directors.

GEORGE B. GILLIE has been appointed traffic manager for the North American Cement Corporation of New York, according to an announcement released by Thomas J. Harte, president.

CHARLES F. NUTT of the Hawkeye Portland Cement Company, Des Moines, Ia., has been elected a director of the manufacturers and jobbers bureau of the Des Moines Chamber of Commerce.

WILSON T. LUNDY, who has had an active role in the American sulphur industry for over a quarter century, has retired as vice-president of Freeport Sulphur Company. He will continue as a member of the board of directors, and his services will be available in a consulting capacity.

Mr. Lundy joined the Freeport organization in 1923, after participating as a mining engineer in various mining enterprises in the United States, as well as in foreign countries. He became general manager in 1930 and was elected a vice-president in the same year. He went from the company's New Orleans operating headquarters to the New York executive office in 1941, when he was elected a director.

Keystone Portland Cement Company, Philadelphia, Pa., has announced the following changes in official personnel:

CHARLES E. SHEARER has been elected executive vice-president; JOSEPH B. MCCRACKEN is vice-president in charge of sales; PAUL F. MAURER has been made vice-president in charge of production.

JAMES G. MOERDER has been appointed assistant sales manager of the Ideal Cement Company's Three Forks Division, with headquarters at Butte, Mont. Mr. Moerder was previously on Ideal's sales force at Spokane and Seattle.

H. K. LANGE, since 1945 publicity director for the Vermiculite Institute at Chicago has resigned from this Institute post to retire from active service.

Mr. Lange has been associated with the vermiculite industry since 1934, and with Vermiculite Institute since 1945. During these years, he directed the preparation of many articles dealing with the uses of vermiculite in construction and other fields.

L. A. CASTELL, assistant to Mr. Lange since 1943, will succeed him as editorial director, and will continue to bring to the attention of the building industry new uses of vermiculite products as they are developed.

S. T. Reese

SETH T. REESE JR. has recently joined the staff of the National Slag Association in the capacity of engineer and administrative assistant. Mr. Reese will divide his time between work in the field on engineering problems and duties in the headquarters office as assistant to the managing director.

Mr. Reese was formerly associated with the engineering corps of the Glen Alden Coal Company, after which he served with the Army Engineers.

Recently named to new offices in the National Gypsum Company organization were E. BRADFORD HOLLINGSWORTH and PAUL H. FRETTHOLD. Mr. Hollingworth was appointed production manager in charge of six National Gypsum plants, and Mr. Fretthold is production control manager.

Mr. Hollingsworth, a graduate of Carnegie Institute of Technology, worked at Clarence Center in various production-line jobs and was assigned to the Buffalo office as assistant to the controller in 1938. In 1940 he was transferred to the production department as chief clerk and later became production engineer. In 1945 he was named works manager at National's York, Pa., lime plant. He returned to Buffalo in 1947 as assistant production manager.

Mr. Fretthold worked for three years in the cost department and served in the controller's department for ten years as plant auditor and as supervisor of plant auditors and cost control. As production control manager, he will supervise the company's manufacturing operations.

obituaries

EDWIN PAUL WEESE, vice-president in charge of operations for the Carbon Limestone Company, Lowellville, O., suffered a fatal heart attack on February 12 while attending the annual meeting of the National Crushed Stone Association in Chicago.

Mr. Weese had been associated with the firm's subsidiary, The Carbon Concrete Brick Company, since June 1, 1926, and was a director and vice-president of that company also at the time of his death. He was a director and a vice-president of the National Concrete Masonry Association and a member of the board of governors of the Youngstown Builders' Association.

FRANCIS M. TAYLOR, chief engineer of the Birmingham Slag Company, Birmingham, Ala., and president of the Drummond Trucking Corporation, died on March 25 at his home in Birmingham. Mr. Taylor was widely known throughout the South as an engineer in the design and operation of slag and aggregate producing plants.

ALVA B. MURDOCH, owner of the A. B. Murdoch Sand & Gravel Company at Dallas, Tex., died of a heart attack on February 2 in that city. Mr. Murdoch, 66, pioneered in the sand-and-gravel business, and founded his company in 1923.

J. Ralph Turner, 47, head of the Queen Sand & Supply Co., Buffalo, N. Y., died unexpectedly on February 4. Mr. Turner organized the company in 1923 after coming to Buffalo from Peterboro, Ont., Canada.

Parlane A. Macfarlane, a salesman for the Consumers Company of Chicago, died recently in a Chicago hospital at the age of 75 years. In earlier years he had been traffic manager for the Wisconsin Lime and Cement Company before that company was purchased by Consumers.

Hugh B. Hammond, president of the H. B. Hammond Sand Company, Louisville, Ky., died on January 7 of injuries received in a fall. The accident occurred in his home on December 30, 1949. Mr. Hammond founded his business in 1915. He was 61 years of age.

Kenneth Bosley was the victim of a fatal accident which occurred on February 9 at Joliet, Ill., in the plant of the General Refractories Company. He was crushed to death in a conveyor belt which moves stone to a crusher.

On February 7 Henry McClarnan, 71, former general superintendent of the Western Division, Alpha Portland Cement Company, died unexpectedly in a hospital at LaSalle, Ill.

Mr. McClarnan had been identified with the cement industry since 1901, when he became associated with the Iola Portland Cement Company at Iola, Kan., a plant later acquired by the Lehigh Portland Cement Company. Subsequently he was affiliated with the Ash Grove Lime and Cement Company, the Marquette Cement Manufacturing Company, and the German-American Cement Company. The latter was then in process of being acquired by the Alpha Portland Cement Co. Mr. McClarnan was retired from his duties as division superintendent for Alpha in August, 1949.

Edwin V. Downs, 61, mine foreman for the United States Gypsum Company and an employee of that firm and a predecessor, the Nephi Plaster Company, for 40 years, died on February 12 after an extended illness at Nephi, Utah. Last year he was honored by United States Gypsum Company officials for his years of service.

John H. McNamara, president and treasurer of J. H. McNamara Incorporated and also of the Needham Sand and Gravel Company, Inc., Allston, Mass., died on February 11.

Henry T. Rehl, 62, an employee of the Buffalo Dredging Company (Buffalo Sand & Gravel Company affiliate), died on March 27 at his home in Buffalo, N. Y. He was secretary-treasurer of the Sand & Gravel Longshoremen's Union 340.

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Off Your Mine with
NAYLOR
Light-weight ***PIPE***

Engineers have found that Naylor Pipe simplifies many jobs in mining service. Its light weight makes it easy to handle and install. The extra strength and safety found in no other light-weight pipe give Naylor the "backbone" needed for rough and ready mining service. That's why it will pay you to specify Naylor for high and low pressure water lines, hydraulicking, high and low pressure air lines, de-watering and drainage, suction lines, sludge lines and ventilating lines. Naylor Pipe is available in sizes from 4" to 30" in diameter and thicknesses from 14 to 7 gauge. All types of fittings, connections and fabrication.

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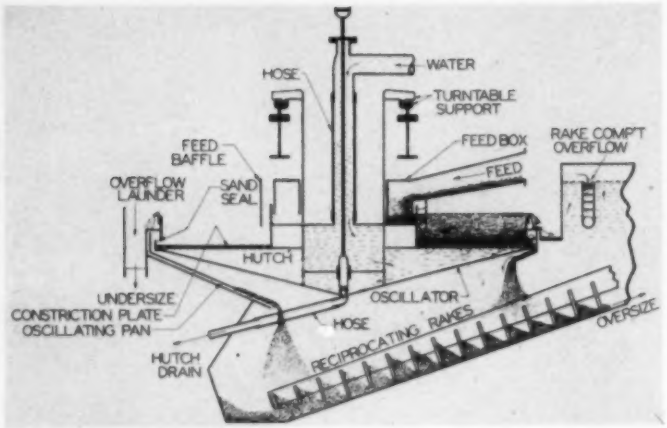
PIT AND QUARRY



● Mechanical-Hydraulic Classifier

As a result of many years of intensive study of the fundamentals of wet grinding and classification, The Dorr Co., Stamford, Conn., developed a new combined mechanical and hydraulic classifier, to be known as the "Dorrco Hydroscillator". The basic principle involved is the inducing of mechanical mobility of the settled oversize.

The Dorrco Hydroscillator consists of two major parts—a shallow, cylindrical oscillating classifying compartment and, directly below, a reciprocating rake dewatering compartment. A vertical motor drive unit imparts to the cylindrical oscillation compartment rapid circumferential oscillation about a vertical axis. Feed enters through a radial trough or launder terminating in an open-bottom annular feed box at the center. Water under pressure is introduced into the bottom of the classifying compartment through closely-spaced perforations in an oscillating constriction plate. As a result, a "teeter bed" is set up, consisting of particles ranging vertically from fines, close to the mesh of separation at the top, to very coarse granular particles at the bottom. Fine particles which have reached the top of the "teeter bed" are swept outward by the radial flow of hydraulic water, and eventually leave the unit as an overflow product across a peripheral weir.

The coarse, oversize particles work to the bottom of the "teeter bed", flow to the periphery of the classifying compartment, and pass under a stationary side wall and over an oscillating lip into the reciprocating rake compartment. The oscillating effect maintains fluid mobility in this seal. These coarse particles settle rapidly through the water in this lower compartment, are picked up by the reciprocating rakes and advanced up the steeply inclined slope to the point of discharge. Due to the extreme cleanliness of this oversize product and the almost complete absence of lubricating slimes, there is virtually no slip-back on the inclined drainage deck.

At the point where the oversize particles rise in the annulus between the stationary side wall and the oscillating lip under the head imposed by the bed of teetering solids, they meet and must overcome a back pressure or resistance set up by the head of water in the reciprocating rake compartment, the water level of which is maintained at a higher elevation than the pulp level in the oscillating compartment. This results in a "U" tube effect or hydraulic balance. An adjustable overflow in the reciprocating rake compartment may be manipulated upwards and downwards to control the pressure exerted at this point which, in turn, controls conditions in the oscillating compartment and consequently the fineness at which the separation is made.

The Dorrco Hydroscillator is a more expensive machine than standard types of mechanical classifiers and it costs slightly more to operate. Consequently its use will be justified economically only where there is a definite advantage in producing cleaner-than-normal rake products, and in making closer-than-normal separations. The Dorr Co., Barry Pl., Stamford, Conn.

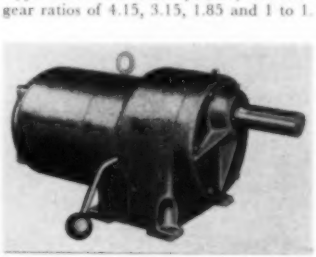
● Selective Speed Gearshift Drives

The Lima Electric Motor Company, Lima, O., announces the addition of a new unit to their line of Lima gearshift drives. This new Lima drive, designated as the Type R3C, features a combination integrally-mounted electric motor and a four-speed transmission having both primary and secondary gear reductions. This unit fills the need for a compact drive of modern design providing low, multiple-output speeds.

Type R3C Lima gearshift drives deliver full rated horsepower in each of the four speeds. Both constant-torque and constant-horsepower two-speed motors are available on these units, which gives the increased flexibility of additional speeds.

Some of the many applications of this type of unit will be found in the individual motorization of automatic screw machines, drag conveyors, mixing equipment and installations where a low range of selective speeds, with high radial load capacity, is required.

Lima gearshift drives are designed for operation on polyphase, a.-c., power supplies of standard frequencies (25-50-60 cycles), and voltages below 600. All Type R3C units have primary selective gear ratios of 4.15, 3.15, 1.85 and 1 to 1.



Where double bruise protection pays off with 65 per cent recappable tires!

THE picture above was taken at Bull Shoals Dam in Arkansas. Note the scraped marks on the sidewalls of the B. F. Goodrich Universal tires. Terrain and rocks at Bull Shoals cause tire problems as tough as you'd ever expect to find anywhere.

For example, *Ozark Dam Constructors, Inc.* operate trucks like the above in a stone quarry. Previously, they operated trucks of this type in excavating a rock filled river-bed. In both places, wet conditions often cause considerable cutting action. And in both places, tires are in danger of bruising and crushing.

In spite of these extremely bad conditions, 65 per cent of the B. F. Goodrich tires on these trucks are found to be recappable!

How do B. F. Goodrich tires do it? Part of the answer is the special cut-resisting tread compound worked out by BFG engineers.

Another part of the answer is the *double nylon shock shield* built into all large B. F. Goodrich off-road Silvertowns. This shield is built in under the tread. It's a set of four layers of rubber-coated nylon cords between the tread and the plies. These breakers are in pairs, with the cords in each pair running parallel to each other, but with each pair running in opposite directions to give balanced strength. The breakers are cushioned with thick layers of shock-resistant rubber.

Under impact, the cords stretch *together*, and return to their original position. The blow is distributed and absorbed by the rubber cushions; the shock passed on to the cord body is greatly reduced.

Find out how B. F. Goodrich off-the-road tires can do *more* work for you and save you money. See the B. F. Goodrich dealer or write us direct. *The B. F. Goodrich Company, Akron, Ohio.*

Truck Tires BY

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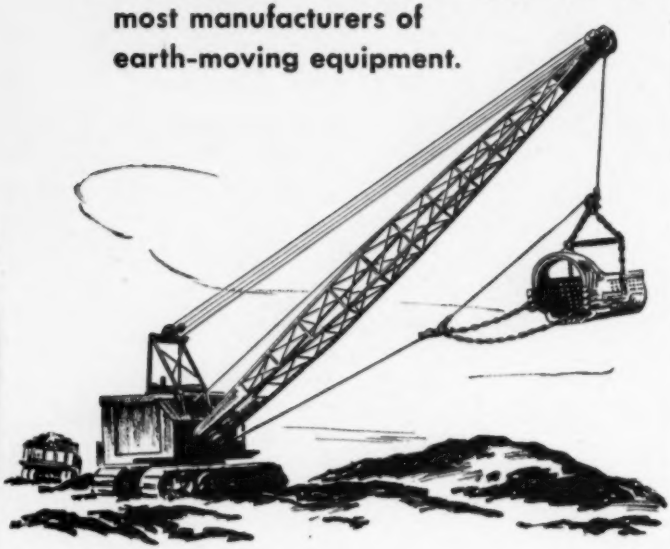
FIRST WITH MANUFACTURERS . . .

J-M INDUSTRIAL FRICTION MATERIALS are specified as original equipment by most manufacturers of earth-moving equipment.



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Operators who want to keep maintenance costs low *know* that JOHNS-MANVILLE FRICTION MATERIALS are easy to wear in, hard to wear out.

If Johns-Manville materials are right to *start* with . . . they must be right to *stay* with. When you order replacements, remember that Johns-Manville says "stop" and "go" to more tonnage than any other friction materials . . . see your Johns-Manville Friction Materials distributor or write Johns-Manville, Box 290, New York 16, New York.

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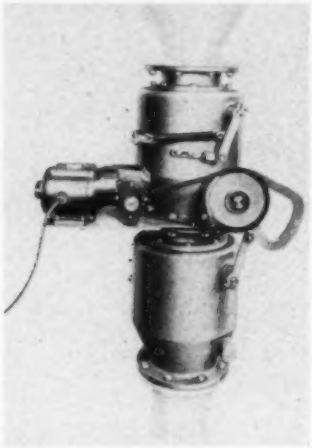
INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

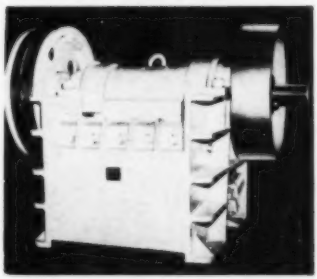
● Flow Hopper Discharge Valve

Buell positive material flow hopper discharge valves for continuous dust or powder unloading in cement plants, chemical processing, and allied industries have been announced by the Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

According to the manufacturer, there is no danger of air in-leakage; and the closing shock of the valve disc automatically shakes loose all clinging material, insuring a steady flow and preventing any plugging tendency in the dust hopper. Only points of wear are in the bushings for cam and drive shafts, which can be simply replaced.



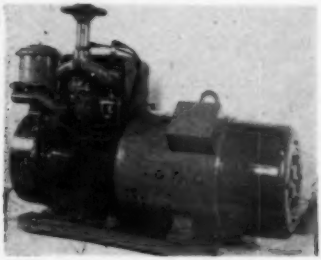
Capacity of the valve is 103.2 cu. ft. of dust per hour, i.e., it could handle 10,320 lbs. of cement dust in an hour. A 16.5 r.p.m. gear reduction type motor supplies the drive. Valve bodies, seats and cams are cast iron; valve discs are steel plate; tripper arms and disc arms are cast bronze; bushings are graphite and self-lubricating.



The Gruendler Crusher & Pulverizer Co., St. Louis, Mo., has developed a new series of jaw crushers, "Series 10". All models of this series are equipped with self-aligning roller bearings and heavy-duty manganese jaws and check plates. A newly patented hydraulic jaw adjustment is said to enable an operator to vary the jaw setting in less than one minute while the machine is in operation.

● Stand-By Power Plant

Because of the increasing interest in stand-by electric power, the Kato Engineering Company of Mankato, Minn., has placed a new model on the market. This electrical plant is powered with a two-cylinder, air-cooled engine. There is no radiator; consequently, no anti-freeze solutions to worry about. The



plant can be installed in freezing atmospheres if desired. The engine is equipped with a high-tension magneto, permitting hand cranking; and there is no need for batteries of any kind unless electric cranking is desired, which is also available. The generator has a rated capacity of 5 kw. It is conservatively rated, and it will start single phase motors up to 3 hp.

The plant is available with automatic transfer switch. Generator is designed to give inherent voltage regulation. Voltage regulation is held to 8 percent on non-inductive loads.

The illustration shows model 45HFW4 with a 5 kw., self excited a.-c. generator, 110/220-volt, three-wire service, 60 cycles at 1800 r.p.m., powered with a Wisconsin Model TF two-cylinder, air-cooled engine.

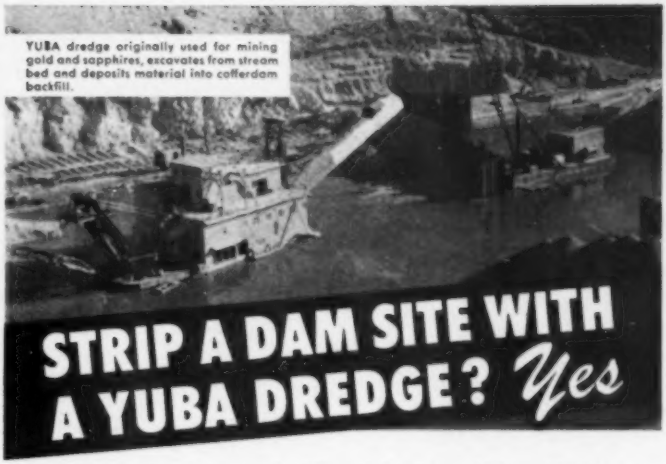
● Photoelectric Eyes

A new standard line of accessories for photoelectric relays, consisting of a complete range of improved light sources and phototube holders was announced by General Electric's Control Division.

According to G-E engineers, the newly designed general-purpose light sources have simple "snap-on" covers that make possible lamp replacement in about 20 seconds. No screws, hardware, or small parts need be juggled in the process. In addition, prefocused lamps are used throughout, assuring that the filament is in the proper position in relation to the transmitting lens of the light source. The phototube holder is furnished complete with phototube, lens, masks, and nine feet of connecting cable.

For mounting convenience both a mounting clamp (providing 360-degree horizontal and 120-degree vertical adjustment) and a standard pipe thread for half-inch conduits are provided.

The new accessories can be applied with photoelectric relays for counting, signalling, limiting, controlling, or protecting. Some successful uses of "electric eyes" have been on conveyors, steam valves, fiber-cutting machines, and automatic door openers, and in indicating water level, misalignment of paper, over-travel of skip hoist, etc.



YUBA dredge originally used for mining gold and sapphires, excavates from stream bed and deposits material into cofferdam backfill.

STRIP A DAM SITE WITH A YUBA DREDGE? *Yes*

At Canyon Ferry Dam on the Missouri River near Helena, Montana, Canyon Constructors save months of time by using a YUBA dredge to handle dam site excavation and cofferdam backfilling in one operation instead of separately.

Dredge stacker also discharges to haul road directly into trucks or for rehandling by shovel and trucks.

DREDGE REMOVES BOULDERS

Sub-contractor Perry & Schroeder Mining Co. moved in a Yuba placer dredge with 6 cu. ft. buckets and 48 ft. digging depth, dug out boulders so sheet piling could be driven for cofferdams. Then the dredge began excavating and backfilling the cofferdams; stripped 250,000 cu. yds. of underwater overburden down to bedrock by the time the diversion flume was ready.

AVERAGES 320 CU. YDS. PER HOUR

Altogether the dredge will handle about 1,000,000 cu. yds. of material, including production of aggregate from underwater deposits. It works three 8-hour shifts daily, averages 320 cu. yds. hourly; has a reach from bucket line tip to stacker end of 250 feet and can discharge material 40 feet above water line.

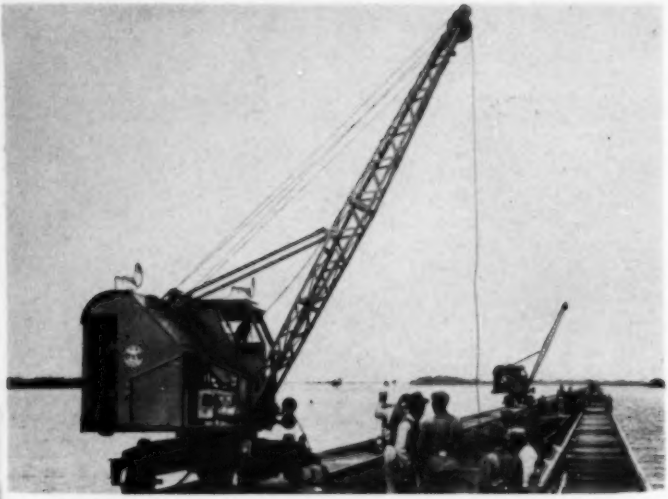
Consult YUBA—No matter what your bucket ladder dredging problem—digging deep ground, clay, boulders, or bedrock; constructing levees, cofferdams or canals; producing aggregate or changing stream channels—YUBA can help you. Write or wire us TODAY. No obligation.

YUBA MANUFACTURING CO.

Room 718, 351 California St., San Francisco 4, California, U. S. A.

AGENTS { DIMZ, DARBY & CO., LTD. · SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E. C. 3.

CABLES: YUBAMAN, SAN FRANCISCO · SHAWDARBCO, LONDON



● Self-Propelling Dragline

Pictured in the accompanying illustration are two "Little Giant" cranes recently delivered by the Des Moines Dragline Service, Des Moines, Ia., to the U. S. Engineers at Norco, La. These machines are equipped with standard gauge railroad-type wheels and hydraulic brakes.

The Little Giant is furnished with independent travel clutches. Weight is 11,500 lbs., and lifting capacity with outrigger or rail clamps is 3800 lbs. at 12 ft. or 2200 lbs. at 16 ft. over the side. Travel speed is 1½ to 3 m.p.h. The unit is powered with M & M 206 gas engine. An Onan light plant (1500-watt) operates the floodlights by remote control. The cab is equipped with a 10-in. fan and an automotive type of heater.

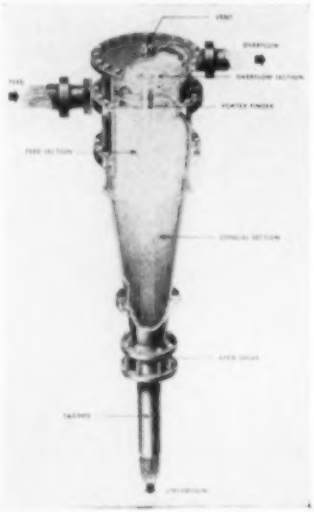
● Fine Solids Separating System

The "DorrClone" and "DorrClone System," the exclusive world's rights to which have been acquired by The Dorr Company in all fields other than heavy media operations, comprise a new method of separating or classifying finely divided solids suspended in a liquid. The DorrClone promises to be an important new tool with which to supplement currently established practices. Previously termed the DSM Cyclone, the system was developed by the Dutch State Mines of Heerlen, The Netherlands, and was originally used in their coal washing plants in Limburg.

The DorrClone is a compact cylindro-conical classification unit which utilizes centrifugal force instead of gravity to accomplish the desired separation. It is similar in shape to the conventional dust-collection cyclones in general use today, but differs in that it is designed to operate on a liquid rather than gaseous suspensions of minute solids. At present it has been found applicable in certain fields, notably the metallic and nonmetallic minerals industries, to such unit operations as hydroseparation, micron-size separations, and the dewatering of deslimed products.

The accompanying phantom view of the DorrClone illustrates the principle of operation employed. Feed pulp, a mixture of of vari-sized solids suspended in a liquid, enters tangentially under pressure near the top of the cylindrical feed section. Attached to the lower flange of this feed section is a conical section down which the feed pulp spirals to an apex valve, and finally to a tailpipe through which the relatively coarse fractions, thrown out of the pulp by centrifugal force, are discharged as an underflow product. Concurrently, the relatively fine fractions in the feed pulp turn and spiral upwards through the center of the conical and cylindrical sections, and out through the vortex finder as an overflow product.

The capacity of the DorrClone and the point at which the size separation is made are primarily functions of its size and the pressure employed, but other design details and adjustments are important in applying it to specific problems. The Dorr Company is prepared to supply DorrClones in 3-, 6-, 12-, and 24-in. sizes. (Size in each instance denotes the inside diameter of the cylindrical section.) Operating pressures vary from 5 to 100 p.s.i., the higher pressures being associated with the finer separations and *vice versa*. The flow covered by the above sizes ranges from 5 g.p.m. to 600 g.p.m. per unit.

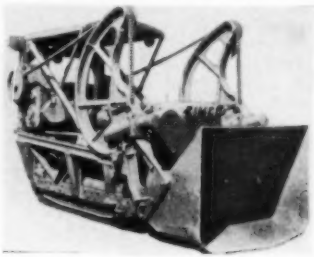


Among the advantages of the DorrClone are the low installation costs and low floor space requirements. Also, it can make separations in the micron range on flocculent pulps without the use of dispersing agents or excessive dilution and, in general, produces a clean, coarse underflow product.

The Dorr Company recommends the DorrClone, in the absence of any unusual conditions, for possible use in the following specific applications: for desliming (removal of ultra fines) most nonmetallic minerals ahead of a concentration step; for degritting (removal of coarse sands and grits) pigments, fillers, etc.; for dewatering (removal of excess moisture) the underflows from hydroseparators; for classifying abrasives, aluminum hydrate, etc. at points down to 10 microns, and for thickening dilute deslimed products coarser than 10 microns. The Dorr Co., Barry Pl., Stamford, Conn.

● Two-Cu. Yd. Shovel

The Eimco Corporation recently announced its new "Rocker Shovel 104", which was featured at a demonstration before those attending the Highway Engineering Conference in Salt Lake City.



The unit, powered by a 48-hp. diesel, loaded wet sand and gravel at the rate of 8 cu. yds. per minute, and filled a 6-ton "Dumptor" in about 40 seconds. It rolls its 2-cu. yd. bucket overhead with ease. The machine can be used for loading or bulldozing.

Having been designed to dig and load blocky rock and abrasive ores in underground or surface operation, the Rocker Shovel 104 is constructed of abrasion-resistant alloy-steel materials throughout. For heavy-duty rock loading the unit is equipped with a 1¼-cu. yd. bucket. It can be powered with either a diesel or an electric motor. The Eimco Corp., Salt Lake City 8, Utah.

● Steel Hardening Compound

The Miracaloy Corporation, 50 Broadway, New York, N. Y., has developed a low-cost, quick-acting steel hardening compound known as "Hard-N-Deep." The product is a powdered chromium-carbon material containing a substance which is said to speed up the hardening process and allow it to work at relatively low temperatures.

According to the manufacturer, Hard-N-Deep under a heating action penetrates the surface of the part being treated and produces a carbonizing, nitriding, and chromizing action. One advantage claimed for the product is that it can be used with standard shop equipment. The part to be hardened is merely heated to a cherry red, dipped into the compound, brought back to temperature, and quenched. Company spokesmen state that the entire procedure can be completed in a few minutes.

Hard-N-Deep is packed in 1-, 3-, 5-, and 10-lb. cans and in 25-, 50-, and 100-lb. drums.

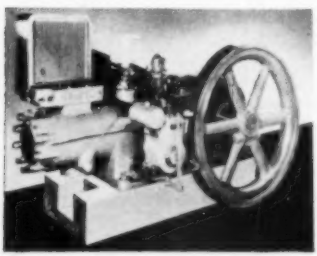
● Horizontal Engine

Development of two new horizontal-type single-cylinder, two-cycle engines is announced by the White-Roth Machine Corporation, Lorain, O. Designated as the Lorain Model R and Model A engines, the units are in quantity production and available for short-time delivery.

The engines are identical except for cylinder bore and brake horsepower output. The Lorain Model R engine with 12-in. bore and 13-in. stroke, produces 45 bhp. at 325 r.p.m.; the Model A with 13-in. bore and stroke produces 55 bhp. at the same speed.

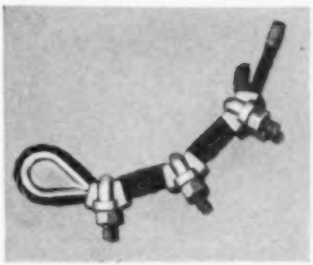
Designed as companion power plants to the well-known line of Lorain L and O engines, both new models have tapered roller bearing crankshafts and auxiliary shafts. Wet-sleeve cylinder liners of alloy cast iron assure long life and easy replacement on location.

The Lorain Model R engine operates on natural gas fuel only. Model A can be operated as a cold-starting, full diesel or converted to burn natural gas or butane. Conversion is quickly accomplished in the field. The condenser-type cooling system eliminates the need for a water pump, and make-up water is negligible. Standard equipment includes Twin Disc Clutch, Pierce Governor, Air Maze oil-bath cleaner, McCord Lubricator, and built in 7½-hp. Lorain gasoline starter.

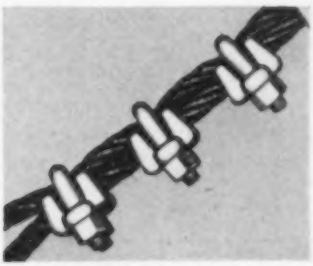


THIS PROVES

"Fist-Grip" Clips superior — see for yourself!

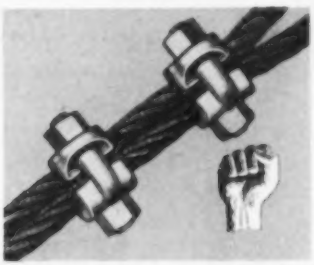


1. U-BOLT CLIPS crush rope into bowed shape when nuts are tightened. Weakened rope endangers safety.



2. CRUSHED ROPE is further damaged by U-bolt clips when rope is under tension. Note crimping.

3. "FIST-GRIP" CLIPS save rope, hold wire straight when clipped. There's no damage, no distortion with "Fist-Grip" Safety Clips.



4. STAYS STRAIGHT under tension. Efficient "Fist-Grip" Clips deliver 95% to 100% of rope's rated tensile strength.

Look to Laughlin for these "Fist-Grip" Clip benefits

Won't crimp or crush — pre-formed or regular lay wire rope; leaves them full strength for safety and longer life

Simple, easy to put on — saves time, manpower, can be put on with *any* type wrench

100% foolproof — can't be put on backward

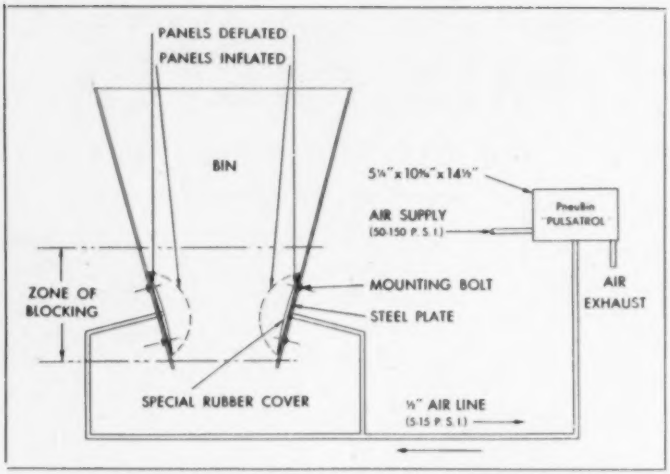
Super grip — two clips do the work of three

Extra strength and safety — only type clip where entire clip, including bolts, is drop-forged

Distributed through mine, mill and oil field supply houses. Write for Laughlin Catalog #145 for complete data on industrial fittings. THE THOMAS LAUGHLIN COMPANY, Department 3, Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



● Feeder Device

A new solution to the problem of feeding stubborn materials through bins and hoppers is provided by the Pneu-Bin, a pneumatic device now manufactured by the Gerotor May Corporation, Baltimore, Md.

The unique PneuBin principle, pioneered by the late U. C. Tainton, has been perfected by Gerotor May engineers in conjunction with technical men of the B. F. Goodrich and Tainton companies.

Pulsating PneuBin panels, strategically mounted on the inside walls of bins or hoppers, keep materials moving by positive displacement, thus preventing arching, funneling and tunneling. Flexible covers for the panels are made of reinforced, highly abrasion-resistant Goodrich Armorite rubber. Air flow to and from the panels is automatically regulated by the PneuBin "Pulsatrol" unit, permitting selection of a wide range of pulsation frequency, force and amplitude.

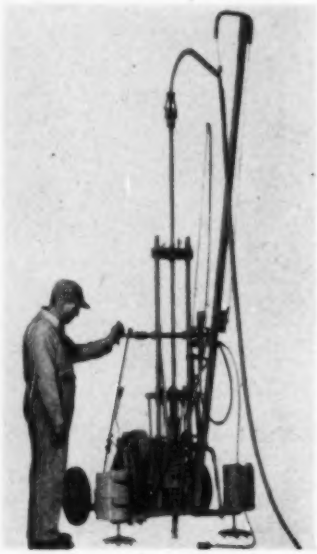
Special advantages cited by the manufacturer include direct action on bin contents rather than the bin, positive extrusions, easy installation, quiet vibrationless operation, maximum safety, and economy. Use of the PneuBin permits closed bin tops and bin storage of materials previously considered impossible to feed from bins.

● Prospecting Attachment

An attachment for the Hossfeld rock drill that adapts it to prospecting has recently been announced by the Hossfeld Manufacturing Company, Winona, Minn.

The attachment pumps water through the drill and recovers the cuttings so that samples may be taken at any interval. By sampling at frequent intervals, an accurate determination of the various strata, their depths and thickness can be made. Powered by a gas engine, it will drill holes from 1¾ in. to 2⅜ in. in diameter to 70 feet in depth. One of the advantages claimed is that the same diameter is drilled full depth.

Also, according to the manufacturer, the Hossfeld drill in actual experience has cut prospecting costs from 50 to 75 percent. It is conveniently transported behind a car or truck or can be hauled in a ½-ton pickup. The pneumatic wheels enable the operator to move it from hole to hole on the job.



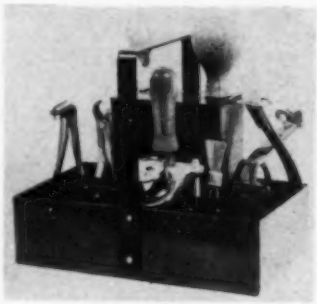
● New Lubricating Material

"Plastilube", described as the successor to grease, is an all-purpose lubricant for which the manufacturer claims the following advantages: no melting; water resistance; better adhesion; no phase change; economy; improved pumpability; and resistance to breakdown.

According to the manufacturer, Plastilube, when subjected to a temperature of 500 deg. F., remained virtually unchanged, while other lubricants were completely melted. Tests for metal adhesiveness and water resistance showed that Plastilube adhered to a piece of metal and was not affected by boiling water, whereas other lubricants emulsified and/or separated from the metal. Warren Refining & Chemical Co., 750 Prospect Ave., Cleveland, O.

● Battery Kit

The GS No. 3F battery service kit consists of a steel tray with a handle and compartments for holding battery servicing tools and water. The water jar is constructed of hard rubber and has two holes, one to hold a hydrometer and the other for a battery filler. A special space is provided for a cell tester to prevent breakage.



The other compartments are spaced to hold terminal spreader, pliers, carrier, brush and terminal puller. Manufactured by General Scientific Equipment Co., 2700 W. Huntington Street, Philadelphia 32, Pa.

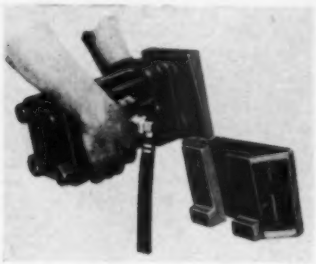
● Truck-Mounted Unit

The Bantam truck-mounted shovel quickly converts to dragline, trench hoe, crane, clamshell, piledriver or magnet crane. It can be mounted on any 1½-ton (or larger) tandem axle truck which permits travel on the highway at truck speeds. The capacity as a dragline or shovel is said to be 60 to 90 cu. yds. per hour—120 yds. per hour with special rehandling bucket; as a trench hoe it digs 100 ft. of 5-ft. ditch per hour; as a crane its lifting capacity is 10,000 lbs.

A feature of the machine is its high degree of mobility. Since it is not necessary to transport it by trailer, considerable time is saved between jobs. The machine is a product of the Schield Bantam Co., Waverly, Ia.

● Pneumatic Vibrator

The Cleveland Vibrator Company, 2710 Clinton Ave., Cleveland, O., announces the development and production of a new vibrator assembly incorporating cast steel male and female wedge-type mounting brackets for attachment to hopper railroad cars. These new "LSRR" vibrators provide an intense vibration to



speed the unloading of such materials as cement, lime, soda ash, carbon, coal and iron ore, as well as other materials shipped in bulk.

In addition to unloading operations, LSRR vibrators are recommended for use on other types of materials handling equipment such as special hoppers, bins, chutes, flasks, mining cars, etc. Female brackets can be attached with bolts or by welding, and a single LSRR vibrator can be moved from one installation to another to eliminate clogging and to speed material flow.

Cleveland type LSRR pneumatic vibrators are available from stock in 3-in. (piston diameter) standard and 3-in. heavy-duty long-stroke sizes. These units weigh approximately 60 and 90 lbs. respectively, and the easily attached female mounting brackets weigh 33 lbs. Air consumption for these new units is 30 and 36 cu. f.p.m on standard line pressure of 80 p.s.i. Through use of a pressure regulator, the speed of operation for the standard unit can be varied from 700 to 1100 vibrations per minute and from 600 to 1000 vibrations per minute for the heavy-duty model.

Equipped with Cleveland swivel-type air intake connections, LSRR vibrators can be moved from one application to another without hose kinking or twisting. Female mounting brackets should be attached so that the vibration is at right angles to the direction of material flow.

Each LSRR vibrator can be furnished with as many female mounting brackets as are necessary to meet specific requirements.

● Electric Motor

Sterling Electric Motors, Inc., Los Angeles 22, Calif., has developed an improved line of gear head electric motors which they term the Sterling "Slo-Speed" motor.

The outstanding feature of this new design is that the motor can be mounted in any position—standard horizontal floor mounting, inverted ceiling mounting, side-wall mounting, or in a vertical position with the shaft pointing up or down.

RIG IT IN

5 seconds!

AMERICAN HEAVY DUTY UTILITY SNATCH BLOCK

Drop forged steel hook
Hinged locking plate
Oversize steel hinge pin
Cast steel sheave—handles any size wire rope up to 7/8"
Alemite fitting for pressure lubrication to bronze bearing
Swing the hook...
Open hinged plate... lay in the line
Close hinged plate... block locks itself!

Here's a snatch block any man can rig in 5 seconds . . . *without a wrench!* No loose parts; nothing to drop or lose. Available in 6", 8" and 10" sheave diameters. Sold by distributors everywhere. For catalog showing all wire rope blocks—1½ to 250 tons . . .

MAIL THIS COUPON

American Hoist & Derrick Company
St. Paul 1, Minnesota

● Please send catalog on AMERICAN UTILITY SNATCH BLOCKS.

NAME _____

COMPANY _____

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CITY _____ ZONE _____ STATE _____

Cost-Conscious Owners buy MICHIGAN ½ yd. Crawler Cranes!

There's no other half-yard crawler crane excavator as good . . . dollar for dollar . . . as the MICHIGAN! Why? Because only MICHIGAN gives you these job-proved, "big-machine" features:

Independent travel to save minutes on every move, hours on every job. Tractor-ease steering to enable faster, easier maneuvering. Automatic, self-locking crawler brakes to give complete safety when working on grades. Smooth fingertip air control to eliminate operator fatigue and that "afternoon let-down."

But, that's not all. There's the oversize internal-tooth circle gear . . . the hook rollers and independent drum assemblies . . . and there are many more. Compare MICHIGAN with any other half-yard crawler crane . . . then you, too, will agree it's your best buy! Take the first step in getting more for your money . . . write, wire or 'phone for complete details.

MICHIGAN POWER SHOVEL COMPANY
315 Second Street, Benton Harbor, Michigan, U.S.A.

● One-Cu. Yd. Shovel

Marion Power Shovel Co., Marion, O., has announced production of a new 1-cu. yd. machine, the Marion Type 43-M.

Front-end changeovers in the field can be made quickly and easily. Simplicity of design eliminates the need for machinery, lagging, or sprocket changes in making front-end conversions. A single boom can serve both shovel and backhoe work, but a gooseneck boom is optionally available for owners who prefer it for backhoe service. A single boom with butt-jointed sections is used for dragline, clamshell, crane or pile-driver service.

The 43-M lower frame and crawler assemblies combine cast and welded construction. Crawler rollers are shielded from dirt, and the crawlers are self-cleaning and non-clogging. The swing gear has machine-cut, hardened teeth and the swing roller path is extra wide to accept the six wide, large-diameter swing rollers.

Machinery supports are built integrally with the 43-M's upper frame to assure permanent machinery alignment. A large V-block swing brake, located on the swing pinion shaft, assures positive holding.

● Multiple V-Belt

A new high-capacity multiple V-belt, with a 40 percent increase in horsepower rating over comparable sizes of standard V-belts used for this service, has been developed by the B. F. Goodrich Co., Akron, O. The belt is also available for use where dissipation of static is essential.

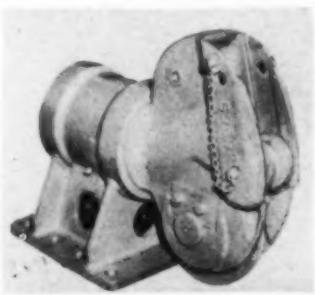
Increase in the capacity of the new belt has been effected without stiffening the belt construction or reducing any of the safety factors inherent in the standard types.

Advantages of the increased capacity belt are that fewer belts have been used to get the power transmission desired.

● New Fairleader

A new all-steel fairleader with a throat large enough to pass a joint made up with Crosby wire rope clips has been announced by American Hoist & Derrick Co., St. Paul, Minn. The new fairleader will find wide application in many fields where an off-lead is necessary or where more universal swiveling is required than is possible with a snatch block.

The sheave and head are mounted on anti-friction bearings for long, trouble-free service.



trade notes

Elevation of Merle V. Lashey to the position of assistant chief engineer in charge of large shovel design has been announced by Marion Power Shovel Co. of Marion, O.

Mr. Lashey, who succeeds the late Glenn B. Heffelfinger, will direct design and engineering work on the Marion Type 5323 and 5561 shovels and the Type 7200, 7400 and 7800 walking draglines.

R. H. Morse

Robert H. Morse Jr., who started with Fairbanks Morse and Company in 1916 in the foundry of the Beloit, Wis., plant, was elected to the presidency of the firm on March 22. Mr. Morse has been vice-president in charge of operations, and previously vice-president in charge of sales, and assistant general sales manager.

His father, Colonel Robert H. Morse, whom he succeeded, becomes chairman of the board. Colonel Morse has been president since 1931 and has spent 55 years with the company. He also started in the Beloit plant. Mr. Morse's grandfather, Charles Hosmer Morse, was the founder of the company.

Mr. Morse is also president of the Diesel Engine Manufacturers Association.

The Ray Wilcox Company, Philadelphia, Pa., manufacturers of the new Wilcox rubber pinch valve, announce the appointment of Mulday Associates, 600 S. Michigan Avenue, Chicago, as Midwestern representatives.

D. D. Kennedy, formerly president of the Kennedy-Cochran Company, Bellwood, Ill., has assumed complete control of that firm. Now known as D. D. Kennedy, Inc., the firm is distributor for the following: Allis-Chalmers tractors and scrapers; Baker bulldozer blades; Blaw-Knox bins, mixers, batchers, and finishers; Bucyrus-Erie cranes, shovels, and hydrocranes; Buckeye ditchers and trenchers; Cedarapids crushing, screening, and asphalt plants; Foote concrete and blacktop pavers; G. M. C. diesel engines; Gar Wood tractor scrapers; and LaCrosse trailers.

The Heat & Power Co., Inc., with offices at 70 Pine Street, New York City, have purchased the entire plant of the Arizona Chemical Company, Brownfield, Tex. This plant consists of several buildings, machinery and pipelines. It is now undergoing liquidation and will be sold whole or in part. The Arizona Chemical Company were refiners of natural sodium sulphate.

Albert I. Edwards has been named basic industries machinery specialist for the Allis-Chalmers Mid-Atlantic region, and William D. Busch, former crusher sales application engineer in the company's basic industries machinery department, has been appointed to the Youngstown, O., district office as a sales representative.

Joseph G. Broz has been appointed sales manager of the Four Cycle Diesel Engine Dept. for the Nordberg Manufacturing Co., Milwaukee 7, Wis.

H. M. Cahill will assist Mr. Broz in directing the sales activities of Nordberg's Four Cycle Diesel Engine Dept.

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A new arc welding machine catalog — Welders for AC, DC, gas engine operation—capacities of 100 to 500 amperes.

Here, at last, is a helpful booklet that gives you complete data on all Airco arc welders — the machines with the stinger that penetrates. Divided into easy-to-read sections, you can quickly determine the welder suited to your production or maintenance job.

This booklet is handy, useful, bringing you a wealth of information covering design, distinctive features, specifications, power requirements, electrical characteristics, and outstanding operational qualities of each welder in the entire Airco line.

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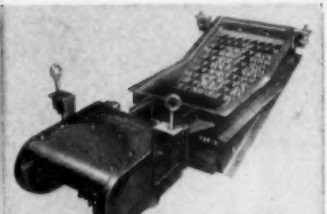

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H. D. Boggs

Hubert D. Boggs, superintendent of Caterpillar Tractor Company's steel fabrication factory in Peoria has been promoted to factory manager at the new Joliet, Ill., plant. The new facilities now under construction at Joliet will be used for the manufacture of bulldozers, scrapers, wagons, and rippers.

Since Mr. Boggs will be concerned primarily with factory operations, his full-time services on the new assignment will not begin until completion of the plant. For the present he will continue with his duties at Peoria.

Andrew E. Brice has been named assistant general manager for contractor market sales for Gulf Oil Corporation. He will assume responsibility for direct product sales to contracting firms and allied industries. The position was newly created in the firm's reorganization of its domestic marketing department.

William C. Bruton has been appointed district sales manager for American Manganese Steel Division of American Brake Shoe Co., and Robert H. Elem has been appointed Pacific Coast manager of the Welding Products Department. Mr. Bruton was formerly sales engineer for Brake Shoe.

The Joy Manufacturing Company has announced two appointments on its sales staff. R. G. Gehlsen is now sales manager, Mines Equipment Division, and H. B. Zeppenfeld has been made manager of industrial sales in the same division.

Mr. Gehlsen joined the division in 1945 as a development engineer and became manager of mining sales two years later. Mr. Zeppenfeld became affiliated with the Mines Equipment Division after having served on the War Production Board.

John L. Sinclair has been appointed Cleveland, O., district manager of the Mechanical Goods Division of the Goodyear Tire & Rubber Company. Mr. Sinclair has been associated with the Mechanical Goods Division of the company since 1924. He joined Goodyear at Chicago.

J. M. Donahue, Mack-International Motor Truck Corporation vice-president, has been named manager of the company's Atlantic Division, with headquarters in Philadelphia. In his new capacity Mr. Donahue will direct all Mack sales and service activities for busses, trucks and fire apparatus in Pennsylvania, Delaware, Maryland and the District of Columbia.

Three new district managers of industrial truck sales for the Hyster Company have been announced.

D. R. Shaffer

Donald R. Shaffer has been promoted to managership of a territory comprising southwestern Canada, eastern Michigan, northern Ohio and southwestern New York.

John F. Wright will take over truck sales supervision in a large Western area, including Alaska, western Canada, Washington, Oregon and parts of Montana and Idaho.

J. F. Wright

Karl T. Barr

Truck sales in the Hawaiian Islands and several Western states including California, Arizona, Nevada and Utah, will be under the direction of Karl T. Barr.

Completion of a new and modern building for the Chicago offices and plant of E. H. Sargent & Co. was announced by T. H. Mints, president of the 97-year old company, which manufactures and distributes scientific laboratory instruments, apparatus and chemicals.

W. Thomas Willey has been transferred to Houston as special representative of the Republic Rubber Division, Lee Rubber & Tire Corporation. Mr. Willey will work closely with east Texas and Louisiana oilmen. He will handle merchandising and engineering problems for both production and refining plants.

Max L. Murdock, acting manager of the centrifugal pump department at Allis-Chalmers Norwood (O.) works, has been promoted to manager of the department, succeeding H. C. Gaton, retired.

Woodrow Brixius, formerly application engineer of the company's West Allis Works centrifugal pump department, has been named assistant to Mr. Murdock, and Paul B. Hugenberg has been appointed application engineer in charge of sales and orders.

Link-Belt Company has announced that Eugene P. Berg, formerly general superintendent, has been appointed to the newly-created position of assistant general manager of the Link-Belt Pershing Road plant in Chicago; and that Richard Moyer, formerly superintendent of the steel shop, has been appointed general superintendent, manufacturing department.

The Pershing Road plant is devoted to the design and manufacture of coal preparation plants, materials handling elevating and conveying installations, dryers, car shakers, car dumpers, grain car unloaders, etc.

Russell G. Davis is a newly appointed sales executive of the Chain Belt Company of Milwaukee, Wis., according to an announcement made by A. R. Abelt, vice-president in charge of field sales forces.

Wayne H. Hunter has been transferred to St. Louis as territory representative, according to an announcement made by G. L. Smith, sales manager, Republic Rubber Division, Lee Rubber & Tire Corporation.

D. S. MacDonald has been appointed assistant to the manager of the gear motor sales division of General Electric's Small and Medium Motor Divisions. Mr. MacDonald formerly was a motor control specialist in the company's Apparatus Department at the Baltimore office.

E. A. Trask, former head of the San Francisco office of John A. Roebling's Sons Company of California, recently assumed his new duties as manager of sales of the company's Chicago corporation. G. C. Bukowsky, former manager of the Portland, Ore., branch, succeeded Mr. Trask.

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Quality Control in MM Factories Assures Dependable Performance on the Job

John S. Shaw, director of safety of the Hercules Powder Company, recently retired after nearly half a century devoted to standardizing chemical operating procedures and the use of safety equipment to prevent industrial accidents.

From 1906 until 1913, Mr. Shaw was engaged in the production of explosives and acids for the old DuPont Company. Since 1913 he has been associated with Hercules. In 1925 he was named manager of the Safety and Service Department. He received his present title, director of safety, in 1941.

Opening of a sales office at 410 West First Street, Dayton, O., has been announced by Cutler-Hammer, Inc., electrical manufacturers of Milwaukee, Wis. P. L. Erickson, C-H sales representative in this area, will manage the office as a branch of the company's Cincinnati district sales office.

C. H. Grant Company, with offices and warehouse at 1401 Eastshore Highway, Berkeley, Calif., has been appointed Marion Power Shovel Company distributor for northern California and western Nevada. C. H. Grant Company was founded in 1932. C. H. Grant is owner.

W. S. Eldredge has been appointed Mutliwall bag sales representative for Union Bag & Paper Corp. His territory will comprise New Jersey and the eastern part of Pennsylvania. His headquarters will be the company's New York office.

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legal decisions

By LEO T. PARKER

Attorney at Law
Cincinnati, Ohio

Must Keep Leased Premises Operative

Considerable discussion has arisen from time to time over the legal question: If a tenant of sand and gravel property allows leased premises to fall in disrepair, what is the liability? Another frequent question is: Is the original lease contract cancelled if the parties make a substitute or second lease? These questions, and others, were answered by a late higher court.

For example, in *Southern Silica Mining & Manufacturing Company v. Hoefer*, 56 S. E. (2d) 321, the testimony showed facts, as follows: For many years the Southern Silica Mining and Manufacturing Company was engaged in the sand business. In 1928 the company and one Hoefer entered into a written agreement which provided for the construction of a sand-drying plant at Summit at a cost of $5,000 on the company's property. The cost was contributed in equal amounts by the company and by Mr. Hoefer.

Under the terms of this agreement Hoefer was to operate the plant and the company was to furnish the sand and the site. The net profits from the operation of the business were to be divided equally. The contract provided that in the event of the death of Hoefer the agreement should terminate and the heirs of Hoefer would sell his half interest in the sand-drying plant to the company at a price to be agreed upon.

The sand-drying business was operated in this fashion until 1938, when the company leased its sand business to Hoefer. Thereafter the company received a stated rent, rather than one-half of the profits under the 1928 agreement. This 1938 lease was renewed on November 1, 1943, for five years.

Hoefer died in 1944, and Mrs. Hoefer continued to operate the business. Mrs. Hoefer refused to sell to the company one-half interest in the business, as provided in the contract between the company and Mrs. Hoefer.

Later Mrs. Hoefer's children opened a new sand pit at Shuler. They put in an industrial spur track and sand pit machinery and began selling sand to the Southern Railroad, which for many years had purchased its sand requirements in this area from the company.

In the meantime Mrs. Hoefer discontinued the operation of the sand pit at Summit, and has since that time shipped no sand from this plant and has not operated the sand pit machinery. It has not been maintained, and together with the industrial track, it was allowed to fall into complete disrepair, although in the 1938 contract between Mr. Hoefer and the Southern Silica Mining and Manufacturing Company, the former agreed to keep the Summit plant in good condition.

In subsequent litigation, the lower court held that Mrs. Hoefer must pay the Southern Silica Mining and Manufacturing Company $10,350 damages for allowing the Summit property to get in disrepair. The court said:

"Since January 1948 when the defendant (Mrs. Hoefer) discontinued the operation of this sand pit she has done no maintenance or repair work on any of the machinery, the buildings or the equipment on the property."

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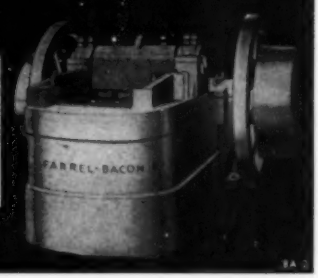

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The lower court also held that the 1943 contract, under which the company accepted cash rental for its property, did not cancel the agreement in the first contract by which on death of Hoefer the company was privileged to purchase Hoefer's one-half interest from the heirs.

Mrs. Hoefer also argued that so long as the rent is paid she has a right to allow the plant at Summit to remain idle, as a standby plant, to gradually shift the business to the Shuler plant and deliver back to the company in 1953 its sand pits in non-operating condition. The court refused to agree and held that Mrs. Hoefer had forfeited her right under the contract to renew the lease contract. The court said:

"This position is not sustained by a proper interpretation of the lease. Examining that document carefully it shows the purpose of the parties was to lease an existing business, not merely the land and machinery. Southern Silica Mining and Manufacturing Company at the time of the first lease had a going concern and had a live operating sand business. It was the intention of the parties that the business should be continued and when the lease was ended for any reason the property should be in such condition that Southern Silica Mining and Manufacturing Company could take over the operation without an hour's delay."

The higher court approved all details of this decision except that it ordered new legal procedure as to whether $10,350 damages was proper. In this respect this amount may be decreased or increased, depending on additional testimony.

Recently a reader wrote an interesting letter, as follows: "I am an official in a cement plant. I am slightly familiar with the Clayton Act and the Robinson-Patman Act, which make it unlawful to discriminate in price between different purchasers of cement. My question is: Do these anti-trust laws forbid a seller of cement to make a different price to distributors and manufacturers? At present we are threatened with a suit because we took a contract from a manufacturer of blocks at a lower price than we are selling large distributors of our product. I shall appreciate your advice, and, if possible, reference to a higher court decision in which this law is discussed."

According to a recent higher court, a seller of cement does not violate the Sherman, Clayton, or Robinson-Patman anti-trust laws, although he sells cement to manufacturers of salable products at less than the price charged large distributors. This is so because specifically the Clayton Act, as amended by the Robinson-Patman Act, makes it unlawful to discriminate in price between purchasers of the same grade of merchandise *only* where the effect is to *lessen competition* or to injure, destroy or prevent competition with any person who receives the benefit of such discrimination. In other words, the law merely forbids preferential prices, services, or facilities connected with the sale of merchandise upon terms *not* accorded to all purchasers on proportionally *equal* terms.

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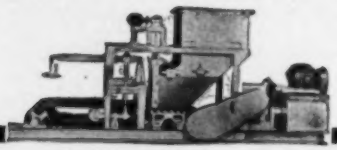

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For example, in *Chicago v. American*, 176 Fed. (2d) 1, reported October, 1949, the testimony showed facts, as follows: A distributor signed a contract with a manufacturer to purchase merchandise for distribution to purchasers and its customers. This contract was through the medium of a 30-day contract. The manufacturer guaranteed against price declines.

The manufacturer made other contracts with manufacturers of various products. These contracts were known as "manufacturer's contracts", and the price for the merchandise was higher than the price at which 30-day contracts were offered to the distributor. These contracts with the manufacturers of products did not carry any guarantee against decline in price, and buyers were required to use the merchandise solely for their own manufacturing purposes. The merchandise under the "manufacturer's contracts" was sold at a higher price than the price charged the distributor.

The distributor sued the manufacturer, with whom it made the 30-day contract, for triple damages under the Clayton Act, as amended by the Robinson-Patman Act, on the grounds that the latter was guilty of discriminating in price between different buyers. The higher court decided that the manufacturer was not guilty of violating the laws and, therefore, not liable in damages to the distributor. This court said:

"There must be proof that a seller has charged one purchaser a higher price for like goods than he charged one or more of the purchaser's competitors . . . . . There was no proof that defendant (manufacturer) charged one purchaser a higher price than it had charged plaintiff (distributor) under similar circumstances . . . . . Defendant's (manufacturer's) classification of its customers as manufacturers and distributors was reasonable and lawful."

Also, this higher court held that a clause in a contract which requires purchasers not to resell merchandise but to use it for manufacturing purposes is not harmful to competition or in restraint of trade and does *not* violate *any* anti-trust law.

The court held further that the Clayton and Robinson-Patman Acts do *not* prevent a seller from eliminating middle men from its distributing system and selling merchandise directly to consumers, nor to distribute a part of its merchandise direct and a part through wholesale distributors.

Blasting vs Standard Methods

Recently a higher court held that a contractor who deviates from standard and recognized blasting methods is liable for resultant damages to nearby property.

For example, in *Balinski v. A. Capone & Sons, Inc.*, 63 Atl. (2d) 810, it was shown that a contractor was engaged in line drilling 6 or 7 in. apart in blasting when within 8 ft. of a private house. The house was considerably damaged and the owner sued the property owner.

In holding the contractor liable the

higher court said that he had violated standard blasting methods since drilling 6 in. apart with lighter charges was in accordance with standard blasting methods.

This court also said that while a contractor has a legal right to blast in performing his contract, he must do so with due regard to the rights of others nearby and that if he was negligent and did not use recognized and available methods he is liable.

Waiver Held Valid

Fortunately I located a new higher court decision which answers a question recently submitted by a reader. This question is: "If a seller of building materials signs a waiver of a mechanic's lien for payment of materials, is the waiver valid if the property owner believes or knows that the general contractor will pay the bill, and then fails to do so?"

This situation very frequently arises when, for instance, a general contractor defaults on his contract and the owner himself takes over the contract and the general contractor still owes for material he used on the construction job before he defaulted.

According to a recent higher court, a waiver of a mechanic's lien signed by a seller or supplier of materials ordered by a general contractor is valid, but the seller or supplier may sue and recover payment from the contractor.

For instance, in *Ligon v. Milholland*, 224 S. W. (2d) 825, the testimony showed facts, as follows: The Ligon Concrete Products Company is a manufacturer of concrete building blocks. George Spruce is a building contractor and also is president of the Arkansas Concrete Products Company.

Spruce made a contract with a property owner to construct a concrete building and furnish all materials and labor for $3,800.

During the progress of the construction of the building, the machinery of the Arkansas Concrete Products Company broke down and Spruce ordered the necessary blocks from the Ligon Concrete Products Company. These blocks were to be delivered on the site of the building.

When the property owner concluded that Spruce as a contractor would not be able to complete the contract for $3,800, the work was stopped and the property owner decided to finish construction of the building. But before starting the work the property owner ordered Spruce to obtain waivers of liens from all companies which previously supplied materials. When the last load of building blocks was delivered, the Ligon Concrete Products Company's agent signed a waiver, as follows: "Waiver of Lien—We, the undersigned, do hereby waive our statutory lien which we may now have on said property or may hereafter have on said property by virtue thereof and agree to look to the contractor personally for the payment of our claim or claims."

Later the Ligon Concrete Products Company accepted a check from Spruce in payment for the blocks, but when the check was returned unpaid, the Ligon Concrete Products Company sued the property owner to recover payment for the blocks on which the waiver of lien was signed, and asked the court to grant a lien on the property to secure payment.

The higher court refused to grant a lien saying that when a seller or supplier executes a waiver of a statutory lien and then later accepts a contractor's check as payment for the materials, the waiver is valid and effective. The court said that the waiver is valid, whether or not the seller or supplier receives payment from the contractor; also if the contractor fails to pay for the materials, the seller must sue and recover payment from the contractor and not expect payment from the property owner. Hence, if the contractor is insolvent, the seller or supplier must suffer the financial loss.

Not a Manufacturer

Considerable discussion has arisen from time to time over the legal question: What is a "manufacturing corporation?" The answer to this question is important because many states have passed laws taxing manufacturing corporations whose main offices or headquarters are in other states.

For example, in *Boston v. Commissioner of Corporations and Taxation*, 84 N. E. (2d) 129, the testimony showed that the state of Massachusetts passed a law

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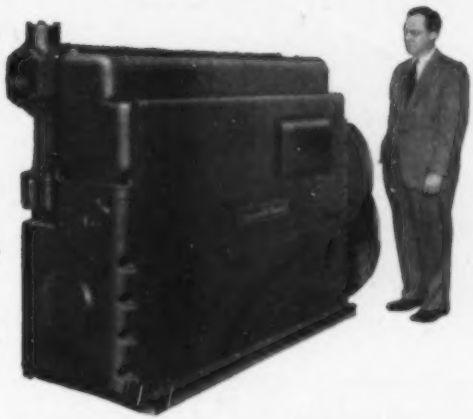

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taxing corporations located in other states engaged in "manufacturing" in the state of Massachusetts. The testimony showed that a corporation makes no glass and like products in Massachusetts but ships into the state large quantities of raw material from its main plant in Pennsylvania into the state of Massachusetts. This material is cut and frabricated in Massachusetts.

In holding that this company is a "manufacturing corporation" subject to paying taxes under the Massachusetts law, the higher court said:

"Cutting, shaping and polishing according to specifications, ... constitute at least a partial if not the complete manufacture. . . . . It is plain that it would contravene the public policy of this Commonwealth declared in the tax exemption statutes to say that the company was not classified as a manufacturing corporation."

No Contributory Negligence

Generally speaking, an employee who contributes to his own injury cannot recover damages for the injury. According to a recent higher court, this law is not applicable to an employee who contracts silicosis.

For example, in *Woodward Iron Company v. Minyard*, 170 Fed. (2d) 508, it was shown that an employee worked for 26 years in dust-laden air. In the year 1943, he commenced to suffer from dyspnea. At first he ignored this symptom. However, as time passed, his suffering increased and he developed a cough which caused him to expel from his lungs red dust, and later much purulent material. The dyspnea and cough became progressively worse, but he continued to work under the same conditions.

In subsequent litigation the higher court held the employer liable in damages to the employee who had contracted silicosis. The court held that the employee by merely performing the duties assigned to him by his employer was *not* guilty of contributory negligence precluding recovery for disability as result of silicosis. This court held also that by failing to adopt effective methods to eliminate harmful concentrations of silica dust, the employer breached his legal duty to provide the employee with a reasonably safe place in which to work.

Dust Is Removed from Plant

According to a recent higher court, if an employer equips his plant with apparatus and devices to remove or reduce the amount of dust in air to a minimum, an employee who contracts silicosis a year or more later is not entitled to compensation.

For example, in *American v. Ellison*, 55 S. E. (2d) 258, the testimony proved that a man named Ellison had worked for the same employer as a stone cutter for 29 years, when he became disabled. He applied for workmen's compensation for silicosis.

In subsequent litigation the testimony showed that 18 months before the employee became disabled the employer had equipped his plant with apparatus to remove or reduce the amount of dust in the air to allowable minimums, and to the point where the exposure to the hazards of the disease of silicosis was no more than normally encountered in every day life.

In view of this testimony the higher court refused to award compensation under the State Workmen's Compensation Act to Ellison.

Injured Employee Insane

It is well established law that an ordinary employee cannot recover compensation for an injury if he delays too long in filing his application with the Industrial Commission. However, according to a recent higher court this rule of law is not applicable to insane persons.

For illustration, in *Torbyn v. South River Sand Company*, 69 Atl. (2d) 588, the testimony showed facts, as follows: An employee while employed by the South River Sand Company as a steam shovel operator was struck in the head by a heavy digger's crane. The blow rendered him unconscious. He suffered lacerations of the head and other severe injuries. Shortly thereafter, he was seized with acute headaches, dizzy spells and hallucinations. He died 11 years afterward. Before his death he filed a Workmen's Compensation petition and received an award for temporary disability of 12 weeks. He never accepted this

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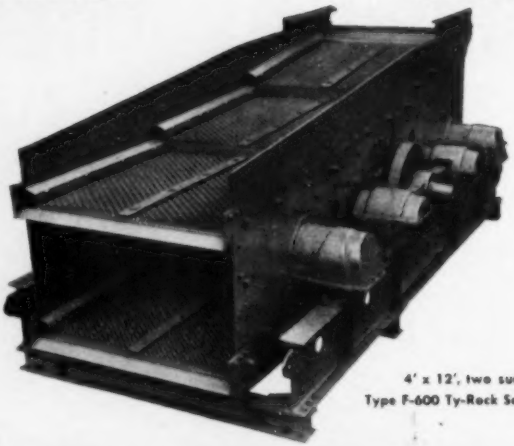

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award. After his death his widow filed an application for compensation under the State Workmen's Compensation Act.

It was contended that no compensation was allowable because both the employee, before his death, and the widow delayed nine years in filing an application. However, the higher court awarded compensation to the widow, saying:

"It is quite apparent from the proofs that decedent's (employee's) mind became seriously affected within a comparatively short period. This mental condition of decedent became progressively worse. . . . . The spirit of the law is to provide weekly compensation for the disabled employee or his dependents, in the event that death ensues."

Statute of Frauds

All states have adopted laws which provide that agreements relating to real estate for more than one year are *void* unless in writing.

For example, in *Baker, Inc., v. Shea, Inc.*, 77 N. E. (2d) 223, it was shown that a tenant had a written three-year lease of property used in his business. It obtained from the landlord an oral or verbal promise that at expiration of the written three-year lease the landlord would extend or renew the lease for another three years.

Later the landlord refused to extend the lease and the tenant filed suit and asked the court to compel the landlord to fulfill his verbal agreement to renew the lease for another three years.

The higher court refused to do so, saying that the verbal promise was void. The court held that this promise should have been in writing.

Court Refuses to Estimate Damages

It is well established law that a court will not estimate allowable damages where a jury decides who is liable under a contract but fails to hold the litigant liable for a specific amount.

For example, in *Consolidated Quarries Corporation v. Davidson*, 53 S. E. (2d) 231, it was shown that a building supply dealer named Davidson made a written contract with the Consolidated Quarries Corporation. The contract provided that Consolidated Quarries Corporation would supply Davidson with his total requirement of crushed granite stone for his use or resale for a term of 5 years. A disagreement arose over the validity of the contract and one year after it was signed the parties decided to make a new contract. However, no new agreement was reached by the parties and the parties continued to operate under the terms of the old contract for two more years, when the Consolidated Quarries Corporation wrote Davidson denying liability under the contract on the ground that it was invalid and unenforceable.

The jury held that the parties must comply with the terms of the old contract. The higher court refused to disturb the jury's decision and also refused to decide the amount of allowable damages.

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how to solve varied handling problems with a SAUERMAN POWER SCRAPER

(Above) This shows how Sauerman Rapid-Shifting Scraper digs a deep, wide cut in a hill. (At Right) Small Sauerman Scraper stores and reclaims surplus limestone dust.

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parties make either a written or verbal contract, and the contract is allowed to terminate without either contracting party notifying the other that he will not renew the contract, under these circumstances, the old contract is automatically renewed.

Permit Allowed

Modern higher courts consistently hold that a zoning ordinance which restricts a locality for residential purposes may become void if the locality becomes "run-down" and unfit exclusively for residences.

For example, in *Holgate v. Zoning Board*, 60 Atl. (2d) 732, it was shown that a residence district had gradually yielded its desirability for residential purposes. The owner of a lot applied for a permit to construct a garage and plant. The permit was refused by the municipal zoning board because the lot was in the above described residential locality. The higher court reversed the verdict, saying:

"We are constrained to hold that in the circumstances the action of the board denying the application was arbitrary and a clear abuse of discretion. . . . . Here the uncontradicted and unimpeached testimony in favor of the application clearly establishes that the lots under consideration are in a locality which had gradually yielded its desirability for residential purposes to the ravages of time and to the gradual incursion of industrial activities."

Employer Not Liable

Considerable discussion has arisen from time to time over the legal question: If an employee is employed and paid by his employer, who is liable if the employee is injured by acts of another employer while the employee is performing duties for his regular employer?

For example, in *St. Louis-San Francisco Ry. Company v. Johnson*, 177 Fed. (2d) 550, the testimony showed facts, as follows: One Johnson was in the employ of the East Arkansas Construction Company, operator of a gravel plant. His duties included cleaning out cars which were to be loaded with gravel from a ramp or loading platform. The ramp was close to the side track.

One day a switchman of a railway company was attempting to place cars on the gravel company's side track when a car became loose from the train and rolled against a car in which Johnson was working. Johnson was thrown or fell between the cars and was run over. His dependents sued to recover compensation under the State Workmen's Compensation Act.

The question presented the court was: Which company is liable to Johnson's dependents, the railway company or the gravel company which paid Johnson's salary. The jury held the railway company liable. The higher court approved the verdict, and said:

"The question whether the switchman was negligent in his handling of the cut, and, if so, whether the death of Johnson was the proximate result, were clearly questions of fact for the jury. . . . . The judgment appealed from is affirmed."

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CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 87474 (2)—Limestone, ground or pulverized, unburned, carload minimum weight 60,000 lbs., proposed to establish a rate of 286 cents per net ton in open cars and 336 cents net ton in closed cars from Maple Grove and Narlo, O., to Library, Pa.

Docket 87476 (1)—Proposed to establish a stone (crushed), stone screenings, and agricultural limestone (not ground or pulverized), in bulk in open-top cars, straight or mixed carload, minimum weight 90 percent of marked capacity of car except that when car is loaded to full cubical or visible capacity, actual weight will apply from Marengo and Milltown, Ind., to Erskine, Evansville, Ft. Branch, Haubstadt, Ingle, Kings, Stacer, and Wansford, Ind., 137 cents net ton. Rates are not subject to ExParte 162, 166 or 168 increases.

Docket 87486 (1)—Proposed to establish on limestone, agricultural, unburned, in bulk in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Russellville, Ind., to Dana and Montezuma, Ind., 70 cents net ton.

CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 87488 (2)—It is proposed to establish a rate from Marble Cliff, O., to Jackson, O., of 153 cents per gross ton on stone, fluxing, furnace or foundry, melting or refractory, unburned, in bulk, in open-top cars, minimum weight 90 percent of marked capacity of car except that when cars are loaded to full cubical or visible capacity, actual weight will apply.

Docket 87490 (2)—Proposed to establish on stone, crushed, in bulk in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when cars are loaded to full cubical or visible capacity, actual weight will apply from Spencer, Ind., to destinations in Indiana. Rates are indicated in Exhibit A shown below:

Exhibit A
From Spencer, Ind., to Following Indiana Points

Vincennes	107*
Decker, Evansville, Ft. Branch, Hazleton, Haubstadt, Ingle, King, Patoka, Princeton, Purcell, Stacer	134*

*Rates in Cents per Net Ton Include ExParte 162, 166 and 168 Increases.

Docket 87496 (2)—Proposed to establish on crushed stone, carload, in open-top cars, minimum weight 90 percent of marked capacity of the car furnished, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Greenfield, O., to Glen Jean, O., 70 cents net ton. Rate not subject to ExParte 162, 166 and 168 increases.

CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 87518 (2)—Slag, crude (the product of iron or steel furnaces) not crushed, ground or pulverized, in open-top cars, carload minimum weight 60 tons per car. Establish from Youngstown, O., to Canton and Massillon, O., 70 cents net ton. Rate not subject to X-162-166-168 increases.

Docket 87519 (2)—Proposed to establish on sand, all kinds, and gravel, in open-top cars, carload minimum weight 90 percent of the marked capacity of the car, except that when car is loaded to full visible or cubical capacity, actual weight will apply from Columbus, O., to Adam's Mill and Conesville, O., 158 cents net ton; to Coshocton, O., 165 cents net ton; to Frazeysburg and Trinway, O., 153 cents net ton; and to Hanover, O., 146 cents net ton.

Docket 87520 (1)—Proposed to establish on stone, crushed, in bulk, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full visible or cubical capacity, actual weight will apply, from Bellevue, Carey and Sandusky to Cleveland, O., 140 cents net ton.

Docket 87528 (1)—Proposed to establish on crushed stone, carload, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from North Baltimore, O., to Defiance, O., 55 cents.

GENERAL FREIGHT TRAFFIC COMMITTEE
EASTERN RAILROADS

Bulletin G-1499 (Shippers) — Stone, crushed and screenings, in open-top cars, carload minimum weight 90 percent of marked capacity of car, from Latrobe, Pa., to Altoona, and New Castle, Pa., $1.71; Columbus, O., $2.74; East Palestine, O., $1.77; Erie, Pa., $2.19 and Salem, O., $1.89 per net ton, including ExParte 162-B, 166-C and 168-A increases, in lieu of present sixth class rates.

Bulletin G-1555 (Carriers)—Proposed to establish on stone, fluxing, furnace or foundry, melting or refractory, unburned, in bulk in box cars, minimum weight 90 percent of marked capacity of car, etc., from Woodville, Gibsonburg, Millersville, Bettsville, and Maple Grove, O., to Jeannette, Pa., $2.83 per gross ton, not subject to ExParte 162-B, 166-C and 168-A increases.

Bulletin G-1567 (Shippers)—Proposed to

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establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 lbs., from Woodville, O., to Vicco, Hazard, Hardburly, Tribbey, Combs and Sunfire, Ky., $3.83 per net ton, in open cars, $4.32 in closed cars; Elkhorn Mines, No. 4 and 6 Kentucky $4.07 in open cars and $4.57 in closed cars; Jewell Ridge, Ky., $3.95 in open cars, $4.44 in closed cars, including ExParte 162-B, 166-C and 168A increases, in lieu of present combination rates.

GENERAL FREIGHT TRAFFIC COMMITTEE EASTERN RAILROADS

Bulletin G-1599 (Shippers)—Limestone, crude, fluxing, foundry and furnace, in bulk in open-top equipment, carload minimum weight 90 percent of marked capacity of car, etc., from Bellefonte-Pleasant Gap-Chemical, Pa., to Branchton, Pa., $2.07 per gross ton, including ExParte 162-B, 166-C and 168-A increases, in lieu of present rate of $2.32.

Bulletin G-1645 (Shipper)—Proposed to establish on stone, crushed, carload minimum weight 90 percent of marked capacity of car, but not less than 45 tons, from Narrows, Va., to Alloy, W. Va., $2.07 and to Charleston and S. Charleston, W. Va., $2.19 per net ton, including Ex Parte 162-B, 166-C and 168-A increases.

WEEKLY DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS

Docket A 3240 (c)—Proposed to establish on lime from Knoxville, Tenn., group to Carteret, N. J., 916 cents for a 15-ton car and 757 cents for a 25-ton car. Rates are in cents per net ton. Not subject to X-162-166 and 168.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 51411 (1)—Proposed to establish on gypsum, crude or crushed (not ground) in bulk, from Carla, La., to points in Southwestern Freight Bureau docket:

To	Cents per net ton Minimum weight 80,000 lbs.
Specari, Ala.	3.20
Boyles, Leeds, Phoenixville, and Ragland, Ala.	3.80
Nashville and White Bridge, Tenn.	4.00
Rossville, Ga., Chattanooga, Cowan, Jersey, Knoxville, McCarthy, Richard City and Tyner, Tenn.	4.20
Clinchfield, Ga.	4.40
Kingsport, Tenn.	5.00
Tampa, Fla.	5.40

Docket 51679 (1)—Proposed to establish on gypsum, crude or crushed (not ground) from Carla, La., to Kosmosdale, Ky., 460 cents per ton of 2000 lbs. in bulk, carload minimum weight 80,000 lbs.

TEXAS-LOUISIANA FREIGHT BUREAU

Docket 10832-TX—Crushed limestone from Beckmann to Houston, Tex. Shipper's proposal to establish rate 79 cents per ton of 2000 lbs., from Beckmann to Houston on crushed limestone to be used for fluxing purposes only in the manufacture of iron and steel articles. Rate proposed is made with relationship to rates from other origins to Houston for same purpose.

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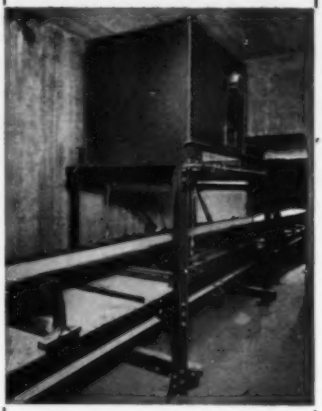

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TRANSCONTINENTAL FREIGHT BUREAU APPLICATIONS

Docket 6479 (Shipper)—Proposed to establish on gypsum, carload, a rate of 29 cents, minimum weight 50 tons from Cody, Wyo., to Bellingham and Concrete, Wash., and other Washington and Oregon points, Tariff 4. This rate is not subject to X-162, X-166 and X-168 increases.

FREIGHT TRAFFIC COMMITTEE TRUNK LINE TERRITORY RAILROADS

Docket TL 472 (Shippers)—Proposed to establish on stone, crushed and screenings, in straight or mixed carloads, in bulk in open-top cars, minimum weight 90 percent of marked capacity of car, etc., from Glens Mills, Pa., to Newport, Del., 80 cents per net ton, including ExParte 162-B, 166-C and 168-A increases, to expire December 31, 1950, in lieu of present rate of 96 cents.

Docket TL 498 (Shippers)—Proposed to establish on limestone, crude, fluxing, foundry and furnace, when loaded in bulk, in open-top equipment, carload minimum weight 90 percent of marked capacity of car, from Inwood, W. Va., to Port Ivory, S. I., N. Y. $3.43 per gross ton, including ExParte 162-B, 166-C and 168-A increases, in lieu of present sixth class rate.

Docket TL M-575 (Shippers)—Proposed to establish on limestone, crude, fluxing, foundry and furnace, in bulk, in open-top equipment, carload minimum weight 90 percent of marked capacity of car, from Naginey, Pa., to Bethlehem, Pa., $1.95 per gross ton, including ExParte 162-B, 166-C and 168-A increases, in lieu of present rate of $2.22.

WESTERN TRUNK LINE COMMITTEE HEARING

Docket 25-244—Proposed to establish on lime, common, viz., lump, crushed, pulverized, or hydrated, in straight or mixed carloads, minimum weight 50,000 lbs. from Mankato, Minn., to Chicago, Ill., 29 cents per 100 lbs., not subject to X-162, X-166 and X-168 increases.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket X-E-41-1185 (Shipper)—Proposed to reduce rates on stone, broken, crushed, or ground in open-top equipment, carload, limestone, agricultural, ground or pulverized, carload, in open-top equipment, per item 119 to 124, Supplement 21 Wabash Tariff W-8855, ICC 7439. From Huntington, Mo., Wabash R.R., to stations on the Wabash R.R., in Illinois, in order to restore relationship of these interstate rates *versus* the basis applicable on Illinois intrastate traffic.

Docket E-158-59 (Shipper)—Slag (except ground open hearth basic slag or basic phosphate slag), carload minimum weight as specified in Item 180-C, SWL Tariff 162-T, ICC 5736. From Siglo, Tenn., to Easley, Mo. Proposed to establish a rate of $3.68 per net ton. Includes X-162-B, X-166-C and X-168-A increases.

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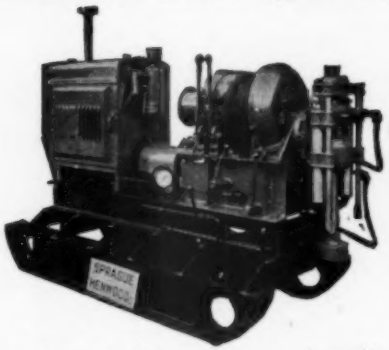

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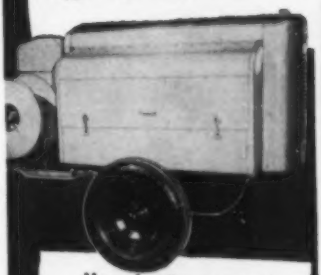

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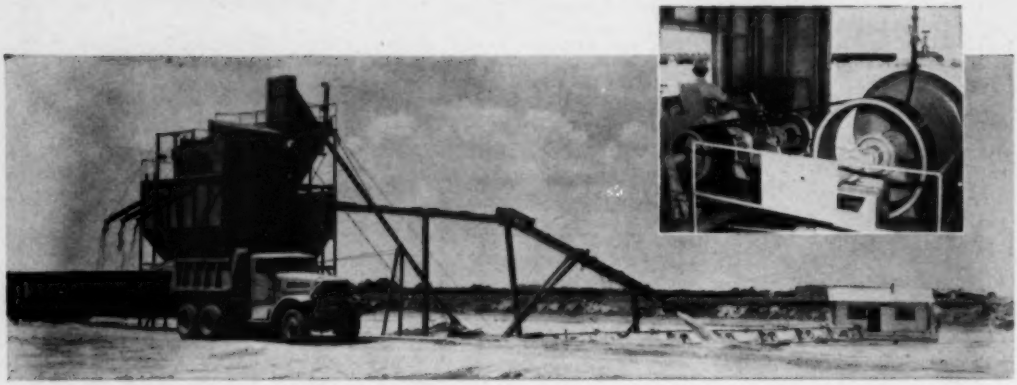

For Efficient Gravel Production—H&B Pumps

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The Walt Keeler Co. is typical of the many important gravel producers in all parts of the country who have found H & B pumps dependable and efficient. H & B Standard and Dreadnaught type pumps are available in sizes to meet the requirements of any type of dredging job and head conditions.

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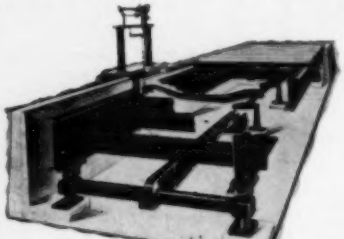

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Herringbone SPEED REDUCERS—

. . . are built in single, double and triple reduction types. Symmetrical gear arrangement provides balanced loads on liberally proportioned bearings. Housings are substantially constructed, well ribbed and have generous pads for foot bolts.

The method of selecting these reducers with complete horsepower and dimension tables is shown in Catalog 70.

Since 1890 **Jones** *In The Service Of Industry*

W. A. JONES FOUNDRY & MACHINE CO.
4441 W. Roosevelt Rd., Chicago 24, Ill.

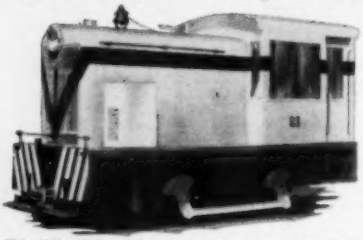
Herringbone — Worm — Spur — Gear Speed Reducers
Pulleys • Gears • V-Belt Sheaves • Anti-Friction Pillow Blocks • Friction Clutches • Flexible Couplings

LOADING HEIGHT ONLY 6½'
"LANDIS SPECIALIZED DESIGN"

10 TONS
PAY LOAD
FOR USE WITH
HIGH LIFT LOADERS

LANDIS STEEL COMPANY
Picher, Oklahoma

Put PROFIT-POWER on your RAILS



This 1949, 25-Ton, 0-4-0 Davenport brought to a total of seven the Davenport Locomotives serving the Granite City Steel Co., Granite City, Illinois.

Better-Built DAVENPORTS are AVAILABLE in STEAM GASOLINE DIESEL with ELECTRIC or MECHANICAL DRIVE

Write Us Today

The choice of a Davenport Better-Built Locomotive for handling your rail haulage will give you full satisfaction through many years. The inbuilt stamina, the simple controls and the ample, responsive power combine to put PROFIT-POWER on your rails.

Davenport engineers will be glad to receive a description of your haulage conditions—grades, curves, distances and work to be done. They will analyze your needs and submit reliable recommendations to point the way to haulage economy. No obligation whatsoever.

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DAVENPORT LOCOMOTIVES

DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORP.
DAVENPORT, IOWA, U. S. A.

SAFE VERTICAL STORAGE

Neff & Fry Storage Bins keep their contents safe from fire, storm, exposure, collapse, and theft. This is due to structural advantages which have proved their superiority in actual performance for 36 years.

The unique feature of N. & F. Storage Bins is the Super-Concrete Stave. With beaded and grooved edges and diagonal points, each stave interlocks with six adjoining ones. Horizontal joints are saw-toothed. Galvanized steel hoops around the joint areas impinge directly upon all the stave points.

The staves are formed under great pressure. They are dense in texture and have such high compression strength that superstructures are frequently built on top of N & F Bins without extra supports.

Shown in the photo is a 24-ft. dia x 60-ft. high N. & F. Bin erected for Speer Carbon Co., Punxsutawney, Pa. It is used for storing calcined coke. Capacity is 475 tons.

Before you reach any conclusions on vertical storage structures, be sure to get all the facts about N. & F. Bins. Complete information will be gladly sent upon request.

THE NEFF & FRY CO.
161 E. Central Avenue
Camden, Ohio

NEFF & FRY STORAGE BINS

Lightning SAND & GRAVEL PUMPS

Model XB

DO THE TOUGHEST JOBS AT LOWEST COST...

Lightning Heavy-Duty 6, 8 and 10-in. pumps cost less to buy, to operate and maintain. They pass large solids at heads up to 130-ft., take the bumps and friction with almost no wear. Oversize shaft and bearings, quickly replaceable parts. Write today for information.

FREE BOOK

KANSAS CITY HAY PRESS CO.
801 Woodswether Road Kansas City 6, Missouri

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT & QUARRY

ONLY SUPREMIX INC.

401 GRACE ST. • • • ADRIAN, MICH.

OFFERS SO MANY CONCRETE ADVANTAGES

Advanced designs in both layout and equipment now provide the Ready Mixed Concrete Industry opportunity to deliver quality concrete at lower costs. Your inquiries regarding new plant or modernizing are solicited.

AT SUCH LOW COST

SuPREMIX plants are of rugged, simple design, easily and quickly erected. Lower in cost. Insure fast processing of controlled slump concrete.

★ ★ ★

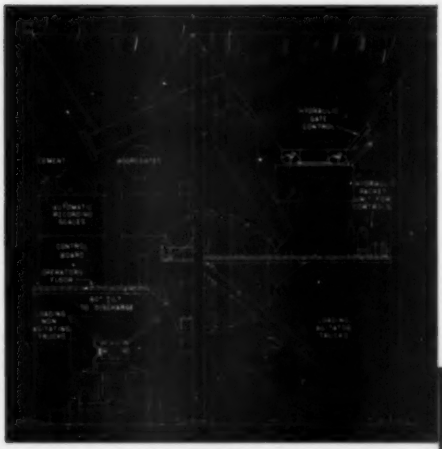
The new SuPREMIX tilting mixer is furnished complete with supporting frame structure—no expensive elevated foundation. The unique tilting arrangement permits lower mounting of mixer and lower over-all plant height. An improved blade arrangement results in faster, better mixing with quick, complete discharge of concrete free from segregation.

★ ★ ★

An exclusive feature of the SuPREMIX Mixer is the PLASTOGRAPH. This device continuously signals the consistency of the concrete during the mixing, permitting the operator to dump load after load of specified slump concrete.

★ ★ ★

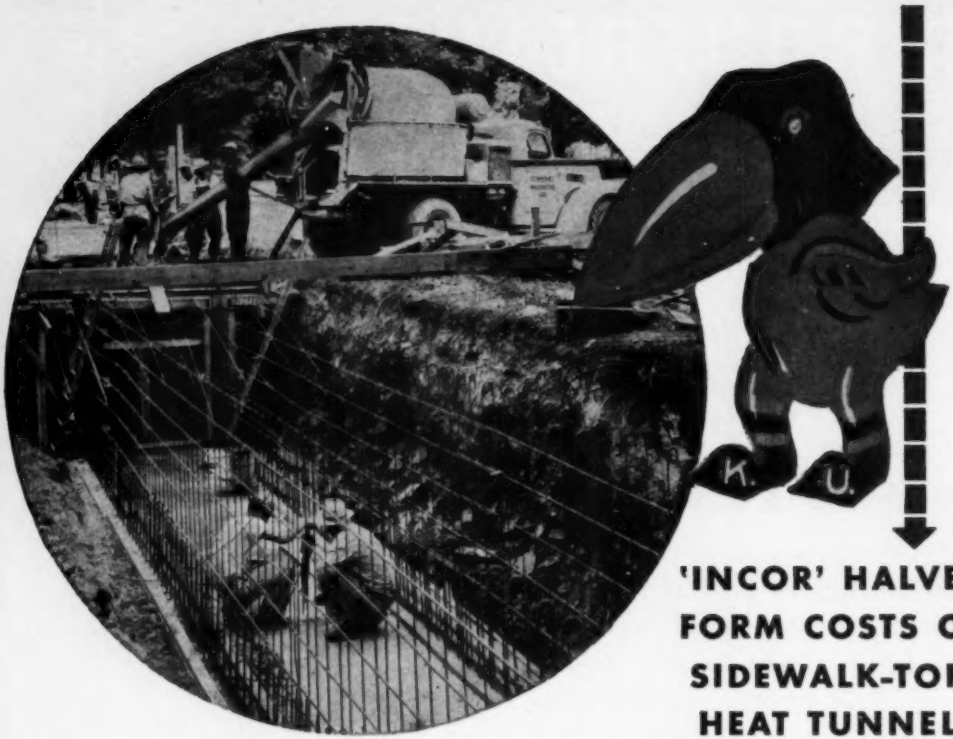
SuPREMIX central mixed, air-entrained concrete can be delivered in SuPREMIX non-agitating bodies. They are low in first cost and maintenance. They haul and cleanly discharge concrete that is consistent in quality, slump and air content.



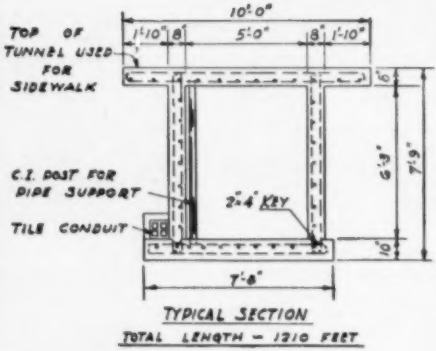
This diagram of typical SuPREMIX central mixing plant indicates some of its features and advantages. Delivery may be by agitating or non-agitating trucks.

SUPREMIX, INC. is an affiliate of the Smith-Olsen Corp. (Oak Sand) manufacturers of the world's most complete line of Concrete Products Equipment.

Here's Why They Ask for 'Incor'



'INCOR' HALVES FORM COSTS OF SIDEWALK-TOP HEAT TUNNEL



HEATING TUNNEL, UNIVERSITY OF KANSAS, Lawrence
Architect: **CHARLES L. MARSHALL,** State Architect, Topeka
Contractor: **CONSTANT CONSTRUCTION CO.,** Lawrence
Ready-Mix 'Incor' Concrete: **THE READY-MIX CO.,** Lawrence

● Meet the Jayhawk, fabulous bird-mascot of fast-growing University of Kansas. Running heat piping from central plant to new buildings meant disfiguring the beautiful campus. Ingenious solution was a heating tunnel under the sidewalk.

'Incor' 24-Hour Cement was used to speed completion, reduce form costs. Concrete placed one day...forms stripped and re-used the next... saving one and possibly two form sets. On-time completion at less cost, bone-dry tunnel, a good-looking job—everybody pleased.

Another example of why the nation's leading Ready-Mix Operators make 'Incor'* concrete available at all times—for customers' time-and-money-saving convenience. *Reg. U. S. Pat. Off.

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Offices: ALBANY • BETHLEHEM, PA. • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS. KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 27,500,000 BARRELS ANNUAL CAPACITY

NEWS OF CONCRETE MANUFACTURERS

3 New Concrete Plants Of Consumers Company Serving Chicago Area

According to an announcement released by officials of Consumers Company, Chicago, the firm on April 3 began accepting orders for ready-mixed concrete deliveries in the Chicago area. Deliveries will be made out of two locations—the McCook quarry and Yard No. 112, the latter located at 2400 S. Loomis Street. A fleet of 30 4½-cu. yd. transit-mix trucks will be in operation in the immediate future. Trucks will be of Mack, White, and International Harvester makes, and the mixers ordered are from Chain Belt, Jaeger, Smith and Ransom. All mixers are of the end-loading, high-discharge type.

Consumers has also announced that a third plant is under construction at Yard No. 79, located at Grand and Central avenues. These facilities were scheduled to be in operation on May 1. The plant will be of the pre-mix type, and mixing will be done with a 6-cu. yd. Smith tilting mixer.

C.P.R. Assn. of Washington Holds Annual Spring Meeting

The annual spring meeting of the Concrete Products Association of Washington, held on Saturday, March 18, drew an attendance of 55 members, associate members and guests. The gathering was held in the A.G.C. Lounge in the Arctic Building, Seattle.

Routine business and committee reports took up the morning session. Plans were also outlined for the 21st annual summer meeting and outing of the organization, and a committee was appointed to make arrangements for this event.

After luncheon in the dining room of the Engineers' Club, R. M. Gilmore, safety consultant, spoke on the topic *Accidents Don't Just Happen*, and showed a film, *Cause and Cure*, emphasizing the need to know where hazards lie and how a program of regular inspection can eliminate these hazards. Mr. Gilmore urged that all the required information on the association's accident reports be supplied completely and in detail if they are to be of value to the industry.

C. M. Howard, association engineer, gave a report on the meetings of the California and national concrete-pipe associations, held in San Francisco in February.

Investigation on pumice masonry was reported by J. J. Wegner and W. E. Cox of the Washington State College, Division of Industrial Research. Some details of the tests and mix design covering this project in progress at the institution were revealed. This preliminary report is a continuing study on panel walls and on sets of blocks tested for dimensional change under varying temperature and moisture conditions. Graphs and charts were revealed which depicted the program involving mix design requirements.

A discussion on recommended construction details for concrete masonry was led by R. J. Cotter of the association staff. Basic building recommendations were outlined, detailing of which are to be incorporated into a loose-leaf pamphlet for distribution to builders, architects, and engineers.

James H. Robertson, B. B. Mason, and W. P. McNamara of the Seattle Engineering Department were honored guests at the evening dinner. Entertainment consisted of the showing of several reels of colored motion pictures taken during a trip into Mexico by Prof. F. H. Rhodes Jr. of the University of Washington.

200 Concrete Weights Anchor Gas Line in River Crossing

Use of reinforced concrete river weights to hold pipe line under water was demonstrated on a large scale recently at the Tennessee River crossing of the Texas Gas Transmission Corporation at Owensboro, Ky.

The project involved anchoring two 22-in. gas lines at a point where the river is 1,300 feet wide. Contractors and engineers used 200 rounded river weights supplied by the Universal Concrete Pipe Company, Columbus, Ohio. These are made in halves and bolted securely over the pipe. A reinforcing bar loops through a recess in the center of each weight for easy handling by crane or hoist hooks.

● A section of the Tennessee River crossing showing the concrete-weighted gas line.

Houston Concern to Open $100,000 R.M.C. Operation As Its Second Plant

Presently under construction at Houston, Tex., is a $100,000 ready-mixed concrete and building materials plant, new facilities of the South End Building Materials Company of that city.

Steel bins are being constructed in Milwaukee, Wis., by the Butler Bin Company, for installation at the Houston site. A 2500-ft. spur track is being built off the G. H. & H. Railroad. According to L. F. Fuqua, president, the new plant is scheduled to be in full production by May 1. The company will continue to operate its original plant on Kirby Drive in Houston under the direction of Mr. Fuqua and D. R. Parker, vice-president.

New Equipment Ups Output At Memphis, Tenn., Plant

Push-button operation is featured at the Bowden Concrete Products plant at Memphis, Tenn., where, according to the local press, enough concrete units are made in 1 hour for a 5-room house.

The credit for the new impetus to production speed is given to the firm's new equipment, a Besser Super Vibrapac plain pallet stripper and other facilities valued at more than $100,000.

Another boost to production is the Campion heating system, which is reported to accelerate curing, at the same time limiting shrinkage and consequent wall cracking.

Universal Concrete Pipe Co. Transfers 3 Staff Members

Transfer of three plant superintendents has been announced by H. X. Eschenbrenner, president of Universal Concrete Pipe Company at Columbus, O.

Clyde Wilson, formerly of the Columbus plant, is now superintendent at Nashville, Tenn. Herman Lawrence has moved from Nashville to Decatur, Ala. A. E. Morris, recently at Decatur, is now at the Atlanta, Ga., plant.

Come-on-Up-and-Try-'Em Ad Lures New Orleans Buyers

Strategically located on a busy corner in New Orleans, La., is an eye-catching advertisement—two sets of concrete house steps, with a convenient and conspicuous sign giving the name and address of the manufacturer.

The steel-reinforced steps are products of the Pre-Cast Concrete Step Company, an affiliate of the Hickham Brick Company. An idea for your advertising program?

Concrete Pipe Machine Co. Operating in New Plant After $100,000 Blaze

Twelve degrees below zero and a 30-mile wind combined to cause a complete loss for the Concrete Pipe Machinery Company, whose Sioux City plant recently burned to the ground, with an estimated loss of $100,000 on the building and its contents.

Less than two hours after the fire was discovered, the entire building was in ruins. Only burned-out desks and files marked the space occupied by the office section adjacent to the heating plant, where the fire started. A defective oil-burner supply line valve has been blamed, but the total destruction of the heating equipment leaves some doubt as to the definite cause of the fire.

Arrangements were well under way by mid-morning of the next day for a temporary office, where business was resumed with the aid of rented desks and office equipment.

Although the plant had brick walls, concrete floors, and most of the contents were metal, it was almost completely demolished, as the first picture shows. With several machines on order and more than a hundred customers depending on the factory for wearing parts, the situation looked hopeless. Rebuilding and retooling without disastrous delays appeared to be impossible. All of the tools were damaged and some of them destroyed beyond repair. It seemed as though six to eight months would pass before production could be resumed. All selling literature was destroyed, as well as most of the drawings and records, covering the details of the equipment and attachments owned by each customer.

The Chamber of Commerce informed the company that another plant in Sioux City was being vacated, and that immediate possession was available. Inspection indicated the plant would be ideal, and the building was purchased without delay. New and used tools were ordered; equipment was moved in and set up within the first month. The management informed us that they were back in partial production within five weeks and in full production by March 4, when the second picture was taken. It shows one of their Model "T" machines being assembled for delivery.

Office and grinding room additions are being erected, and we are glad to report that the Concrete Pipe Machinery Company is taking care of its customers and making deliveries again after a two-month delay. With their larger plant and new and better machine tools, they expect to be able to increase production and make up the production lost during the two-month delay before the end of this year.

Completion of their new pipe plant, where McCracken machines are put under commercial test and where new improvements will be worked out and tested, has been delayed. However, it will be completed this summer and their new Model "TT" machine making 6-ft. lengths will be put into operation and be ready for inspection.

Likewise, their new Model "D" drain tile machine, making sizes 4-in. to 16-in. tile, will be operating for inspection in the same plant. This machine makes 1- or 2-ft. lengths, as desired.

• Scene at the Concrete Pipe Machinery Company's plant after the destructive fire in Sioux City, Iowa.

• Production is resumed at the company's new plant two months after the fire.

Mortarless Masonry Ads Stress Build-Your-Own Theme

The "build-it-yourself" urge has been capitalized successfully by the Mortarless Masonry Corporation of Los Angeles, which has been directing a campaign among southern California home owners.

The theme of the program is "Be a Sunday contractor", featured in a series of advertisements in the Homes Section of the *Los Angeles Sunday Times*. A typical ad is shown which has been devoted solely to concrete masonry garden walls.

Concrete-block walls are extremely popular in that area, and the company stresses the fact that no skilled labor

be a
"SUNDAY CONTRACTOR"
BUILD YOUR OWN GARDEN WALL
With Mortarless Concrete Interlocking Blocks
Also Complete Stocks of
• Cement • Rock
• Steel • Mortar Blocks
• Sand • Rod Capping
MORTARLESS MASONRY CORP.
Los Angeles Plant 2623 Riverside Drive, L.A. 26
NO. 23191

• Posters and ads like these sparked the mortarless masonry campaign.

is required to build a wall of any height by the Mortarless method. These patented blocks have an interlocking feature which insures perfect alignment and allows them to be laid up without mortar. About all the "Sunday contractor" needs is a supply of mortarless blocks, a level, and a rubber-faced mallet to turn out a professional-looking job!

●The Livingston Rock and Gravel Company of Long Beach, Calif., operates a ready-mixed concrete batching plant and plans to erect a new Noble plant at another location. Illustrated above are six of the ten new 5½-cu. yd. Cook Bros. "Challenge" truck mixers which have been added to the company's fleet, now totaling 54 trucks and 20 trailers. Included are 35 Reos. The new mixers are mounted on Ford 1950 Model F8 chassis. The company's new sand-and-gravel plant at Azusa, Calif., was described in the April, 1950, issue of Pit and Quarry.

Announce Perma-Tile Plants In Ohio, New York State

Two plants for the production of Perma-Tile concrete roofing tile are being established this month in New York State and Ohio.

Locations of the new ventures and their owners are the Cummings-Johnson Home Improvement Co., 78 Ash St., Yonkers, N. Y., and the Acorn Products Co., 2121 N. Gettysburg Ave., Dayton, O.

Shipment of semi-automatic Perma-Tiler machines to each of the two purchasers was made in April from the San Bernardino, Calif., factory of the Perma-Tile Concrete Products Co., according to Frank J. Hart, president.

Jackson Heads Universal's Pipe Machinery Division

The promotion of Vincent R. Jackson to the post of chief engineer of the Machinery Division, Universal Concrete Pipe Co., Columbus, O., has been announced by H. X. Eschenbrenner, president.

Mr. Jackson is now in charge of the manufacture of concrete pipe machines and accessories. He also heads research and development for the company.

Lock Joint Pipe Company Buys Two Oklahoma Plants

The Lock Joint Pipe company, East Orange, N. J., one of the nation's major manufacturers of reinforced concrete water conduit, has purchased the Shearman Concrete Pipe Company's plant in Tulsa and another at Oklahoma City. The Shearman plant manufactures all types of concrete sewer pipe and road and other drainage tile.

Lock Joint, which supplied the huge concrete pipe for the first Spavinaw flow line and also is supplying even larger pipe for the present flow line from its temporary 40-acre plant at Pryor, Okla., will enlarge the Tulsa and Oklahoma City plants and add much new machinery.

The announcement was made coincident with the appointment of Cyrus S. Avery, pioneer Tulsa real estate man and former Oklahoma highway commissioner, as state sales manager.

William Perry Little, 55, a member of the sales staff of the Concrete Products Company of El Dorado, Ark., died on March 7 at his home in Strong, Ark.

Building Researchers Issue Publication on Weather And Building Industry

The Building Research Advisory Board, National Research Council, Washington 25, D. C., announces publication of the proceedings of its research correlation conference, *Weather and the Building Industry*, released for distribution to conference members after April 21, 1950.

The publication is an unusual collection of papers by men whose names have top rank in building technology and the weather sciences. The editors found these papers so interesting and full of meaning that no attempt was made to condense them.

They provide a remarkably complete summary of what is known about climatology today and its relationship to the building industry. In addition, they contain penetrating analyses of research in building materials and equipment by men who know the entire field.

The proceedings are published in book form with paper cover, containing over 100 pages. Copies will be distributed to those who paid the registration fee at the conference, and additional copies are available for prompt distribution upon order at $3.50 each.

Huron Sales Force Meets At Alpena—Visits Besser Plant

During the week of March 13 Alpena, Mich., was host to the sales force of the Huron Portland Cement Company, which met at the firm's producing plant in that city. Representatives from Michigan, Ohio, New York, Wisconsin, and other points discussed marketing methods and future sales plans.

A conducted tour of the Besser Manufacturing Company, makers of equipment for the concrete products industry, was an extra-curricular event of the week. The guests visited the development room, witnessed the latest model Vibrapac in action, examined the model of the telescopic center and soffit block construction, and heard a preview of the Besser-Anza roof tile machine.

● D. R. Fox, Besser's general sales manager; T. W. Murray, Huron division sales manager; and C. L. Laude, vice-president of sales for Huron.

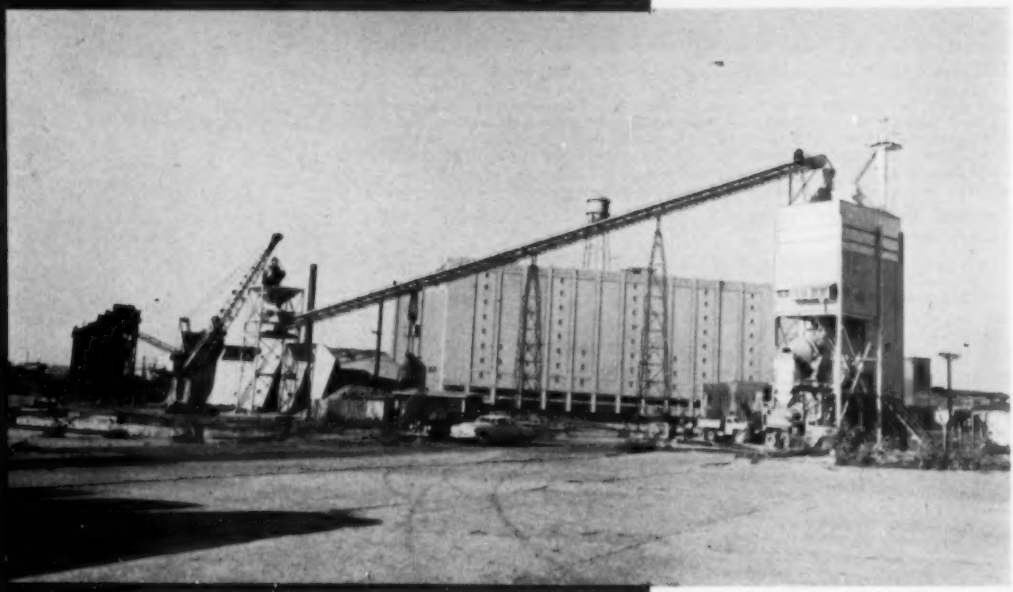
● P. M. Park, vice-president, Besser Mfg. Co.; C. H. Foster, Huron sales representative; J. A. Bezotte, Huron office manager at Alpena; F. G. Welsch, Huron sales representative; and C. L. Laude.

Central Mixing

Plant at Camden, N. J. ... Mixes 2,000 Cu. Yds. ... Day—Tops in Efficiency

BY
WILLIAM M. AVERY

General view of the Camden Lime Company's new central mixing plant located on the Delaware River at Camden, N. J.



Frank B. Hineline, president of the company and designer of the new plant.

another ON THE SPOT report

DRAWING on a rich background of 20 years' experience in ready-mixed concrete operations, Frank B. Hineline, president of the Camden Lime Company, Camden, N. J., has designed and built one of the most efficient and smooth-functioning central-mix plants that we have seen. In addition it is probably one of the largest commercial plants of its kind in the country, for at need it can batch, mix and place up to 2,000 cu. yds. of concrete a day into the company's fleet of agitator trucks. Mixing is done with a 6-cu. yd. T. L. Smith tilting mixer, one of the first machines of this size built by the Milwaukee concern.

The new plant, which went into operation last fall, is located at Atlantic Avenue and the Delaware River in Camden, on the site of a former railroad ferry terminal. Full advantage is taken of this strategic site by using barge transportation to supply the plant with the large quantities of sand and gravel required for capacity operations. The aggregates come from The Warner Company's plant at Morrisville, Pa., about 25 miles up the Delaware River, and barges are unloaded at the dock adjacent to the plant with a Bucyrus-Erie 54-B electric-powered crane mounting a 3-cu. yd. Williams clamshell bucket.

The crane is supported on a concrete pier located about midway between the water's edge and four open concrete bins, the dividing walls of which are radial with the axis of the crane. The bins, each of which holds about 3,000 tons of material, are on the 60-ft. fixed radius of the crane, as is also the 15-cu. yd. elevated steel hopper from which the batching bins are supplied.

With this setup incoming aggre-

gates can be clamshelled directly from the barges into the hopper, and from there reach the 300-cu. yd. batching bins without rehandling, or they can be stockpiled for later reclaiming. Of the 3,000-ton capacity of each of the radial stockpile compartments, about 1,500 tons can be reclaimed without trimming. The remainder is reserve material which can be reclaimed at need by bulldozing it within reach of the crane. Barges, which range from 600 to 1,000 tons in capacity, are unloaded at the rate of 350 t.p.h.

A unique feature of the materials handling system is a set of 12 colored signal lights which show the crane operator at all times the precise status of the bin loading operation. The lights are mounted on the steel frame of the hopper from which the batching bins are supplied. For each of the four bins they show the setting of the turnhead at the top of the plant, and which bins are full and which are down to the point where they should be refilled. The lights indicating the level of the material in the bins are actuated by high and low Bin-Dicators, the high-level units being so located that when the red "stop loading" light flashes on for a particular bin, there is still sufficient capacity for the material in the feed hopper.

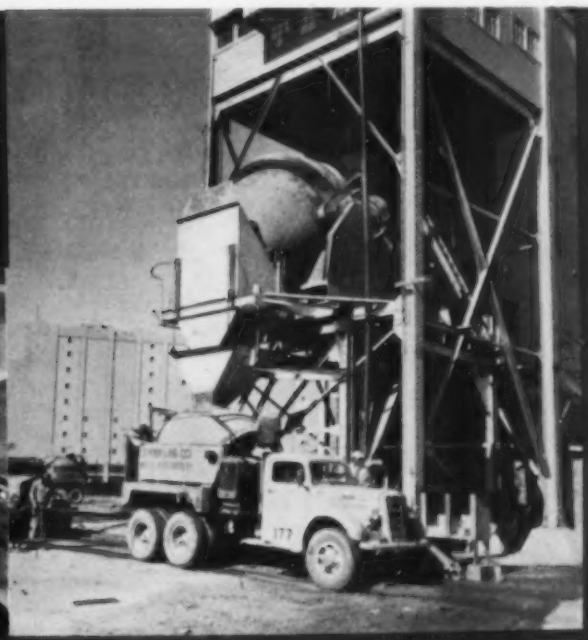
There is a duplicate set of signal lights on the batching platform, so that the batcher and the crane operator are equally aware of the condition of the various bins. The turnhead and the Jeffrey vibrating feeder under the hopper are controlled from the batching floor.

This duplicate signal system, which was worked out by Mr. Hineline, eliminates the confusion and the errors which would inevitably result if orders had to be shouted from the batching platform to the cab of the crane. Since the lights are in full view of two men at all times, they virtually eliminate any possibility of emptying the bins or of overflowing them. From our observation of the system during most of a day we would say that it is as nearly foolproof as any system can be.

The aggregates are elevated from the hopper to the turnhead (100 ft. above ground level) by a 30-in. inclined Pioneer belt conveyor. The conveyor measures 182 ft. from tail pulley to head pulley, and it rises on a slope of 17.56 deg. It is driven by a 50-hp. electric motor and is capable of delivering material at the rate of 450 t.p.h.

The Camden plant actually consists of two adjacent installations of Butler bins. On the river side is the 4-compartment aggregate bin, which has a total capacity of 303 cu. yds. On the land side, and offset about 5 ft., is a 3-compartment cement bin which has a total capacity of 2,065 bbls. One compartment is used for state highway specification cement, and the others for Type 1 and Type 2 cements. Bulk cement cars are shunted onto the 500-ft. rail siding which serves the property, and the material is fed to the bins by means of the conventional undertrack screw conveyor and bucket elevator.

Cement is conveyed from the bins to the 6-cu. yd. Butler batcher by screw conveyors which operate at high speed until most of the required weight of material has been run



Left: Plant Operator Robert Shepard running a moisture-determination test on the special scale for this purpose. This test is run on every third batch, and the necessary correction applied immediately.

Lower left: Dispatcher Jesse Smith works right on the batching platform, thus eliminating delay and confusion in transmitting orders.

Below: The 6-cu. yd. tilting mixer discharging into one of the agitator trucks. The mixer is one of the first of this size to be installed.

The division walls of this structure for open stockpiling are radial with the axis of the crane. The pockets, each holding about 3,000 tons, are on the 60-ft. fixed radius of the crane. The conveyor at the left elevates the material from the hopper to the plant bins.

A view of the colored signal lights which show the crane operator at a glance which bins are full and which require additional material. There is an identical set of lights on the batching platform.

through. They are shifted into low speed by means of an electric eye, and stop automatically when the desired amount of cement is in the hopper.

The plant uses the (SC)² system for controlled batching of all materials, providing a quick and accurate means of compensating for any moisture present in the materials. By means of the (SC)² Toledo moisture meter scale the amount of moisture present in the aggregates can be determined in less than a minute, the percentage of moisture being read directly on the scale. Corrections for contained moisture are made by adding discs, corresponding to the moisture content, to a compensator batching scale. A sealed, automatic recorder called the Inspectograph records the weight of each material and the moisture compensation made in each. According to Samuel F. Gehret, general superintendent, the use of SC² control has resulted in gratifying improvement in water-cement ratio, slump, and cylinder test uniformity.

RECEIVED FROM

CAMDEN LIME COMPANY

LIME **BUILDING MATERIAL** CEMENT

PINE AND WALNUT STS.

26512

Camden, N. J., 194

For

Location

WILL NOT BE RESPONSIBLE FOR BAGS RETURNED UNLESS MARKED ON DELIVERY TICKET

Cu. Yds.		
2	Cement	
	Concrete Sand	
	Pebbles	
	Central Mixed Concrete	
	Bar Sand	
	Lime	
	Plaster	

LEAVING PLANT | ARRIVING ON JOB | UNLOADED ON JOB | RETURN TO PLANT

All delivered prices are for street curb delivery, except where the curb and sidewalk are entirely bridged and protected, and a good road provided to actual point of unloading inside of curb. We will assume no responsibility for any damages where delivery is made inside of the curb.

Driver

CUSTOMER'S COPY

A job ticket checks every step in each delivery.

The batching floor of the plant is so arranged that all necessary operations can be performed from one position. Air-operated gates are used throughout the installation, and the control valves are mounted on a panel in front of the operator. Mix water runs by gravity into a separate compartment of the weigh-batch hopper from a 500-gal. tank which is fed from the city mains through a float valve. Unless the user specifies otherwise, Darex AEA is added to all mixes as an air-entraining admixture. This material is purchased in an aqueous solution ready to use, and the additions are made with a metering device which is accurate within 1/20 of an ounce. The controls for the vibrating feeder under the hopper and the turnhead above the bins are also located on the batching platform.

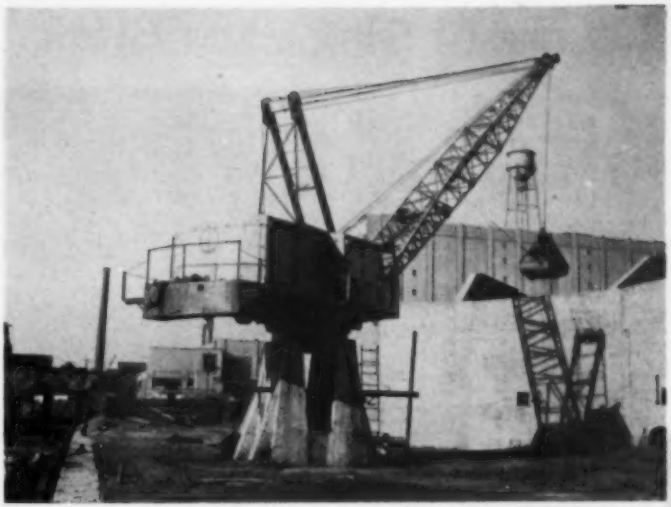
All of the operations incidental to weighing out a 6-cu. yd. batch are performed in about 45 seconds. The operator sets cement, aggregate and water weights on the appropriate scale arms, and throws the various air control valves on the panel to admit the materials to the weigh-batch hoppers. The feed screws for cement and the water valves are two-speed affairs, permitting all but the last 200 lbs. of the materials to enter the hoppers at high speed. The weighed materials drop through a chute into the 6-cu. yd. T. L. Smith tilting mixer. After a full three minutes of mixing the operator trips an air valve which causes the mixer to tilt and discharge its contents into the chute through which the agitator trucks are charged. A fully glassed-in bay built out over the roadway

from the batching platform gives the operator an unobstructed view of both the mixer and the truck being charged.

Because of the unusual height of the plant there is ample room below the batching platform to house the various auxiliary operating units and the company offices. The latter are located on the floor below the batching platform, and the partitions which enclose it are lined with accoustical tile to deaden the noise from above. Also located on this level is a Size 60 Model A Jaeger compressor which supplies air at 100 p.s.i. for the entire plant. There is a standby Deming-Mueller motor-driven centrifugal pump which can be cut into the water line whenever the main pressure drops dangerously low. Steam for heating aggregates and water during winter operations is supplied by a fully-automatic oil-fired boiler; oil is stored in a 4,000-gal. tank.

The Camden haulage fleet consists of 32 truck mixers and one Dumpcrete unit. The agitator equipment is about equally divided between Jaeger and Rex units. At present 12 of the machines are of 4-cu. yd. capacity and the remainder are 6-cu. yd., but eventually the smaller units will be replaced, and the entire fleet will consist of 6-cu. yd. machines. Two Rex agitators placed in service within the last six months are mounted on the new F-8 Ford trucks.

Operating on a full 3-minute mixing cycle, the new plant at Camden puts out 150 cu. yds. of concrete per hour. The maximum haul for delivery is about 25 miles, but the average haul on year-round business is closer to 8 or 10 miles. Most of the material goes into the heavy industry area south of Camden.



The electric-powered crane is mounted on a concrete pedestal midway between the storage retaining wall and river's edge.

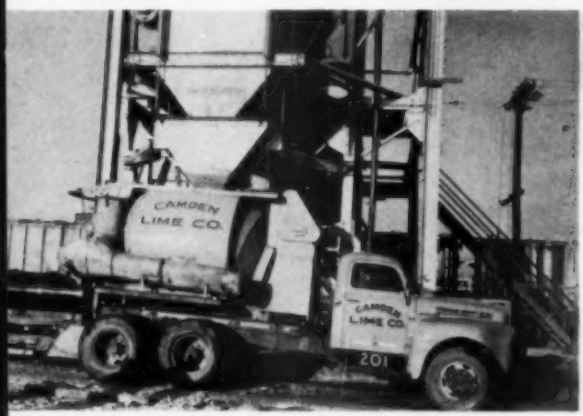
The seven-man crew for this modern well-designed ready-mix operation consists of the plant operator, a helper, the dispatcher, the crane operator, and three laborers. The dispatcher's desk is located right on the batching platform, so there is no delay in transmitting orders, and little opportunity for errors to occur.

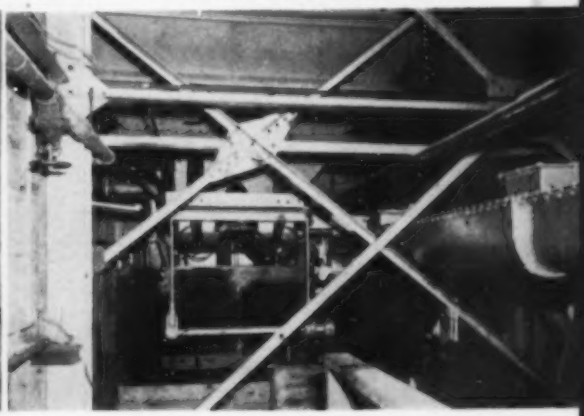
The Camden Lime Company has been in the ready-mixed concrete business since 1930, and in the wholesale and retail building materials field since it was organized in 1893. The company still occasionally operates its old central mixing plant which was built in 1930, but it will eventually be dismantled, since the average haul from the new plant is much more favorable.

A view of the batching control console, showing two of the dial scales. The operator sets cement, aggregate, and water weights on the appropriate scale arms and throws the various air control valves on the panel to admit the materials to the hoppers.

Below: One of the new 6-cu. yd. agitators loading concrete.

Below, right: View of the weigh batcher. The screw conveyor (right) moves the cement from the bins to the batcher.





Makers of Slag Face Brick

By EDWARD J. BRUNENKANT

ON THE SPOT REPORT

THE Silbrico Corporation of Clearing, Ill., operates what is probably the only slag brick factory in the United States. Essentially, a slag brick is composed of 96 parts of water-granulated steel mill slag and 4 parts of high-calcium lime. Under the process perfected by the Silbrico Corp., these constituents combine to make a face brick which by every yardstick is comparable to the finest clay face brick produced elsewhere. Laboratory tests, for example, show that an aged slag brick has a compressive strength in excess of 7500 p.s.i. and a water absorption by weight after 48 hours' immersion of less than 4.5 percent. Combined with a quality product to strengthen the company's competitive position is the fact that the area around Chicago (of which Clearing is an industrial subdivision) affords no suitable clay deposits for the production of quality face brick.

Water-granulated slag, average weight 60 lbs. per cu. ft., is trucked from the Carnegie-Illinois steel mill in South Chicago to the Silbrico plant, where it is stored in a covered storage area that holds 1500 tons. The slag is stockpiled in a shed with a distributing belt conveyor which also serves as a blender. Most of the free water drains off while the slag is in storage.

• On this machine the slag bricks at Silbrico Corporation's Clearing (Ill.) plant are die-formed, two at a time, and molded under a pressure of 140 tons per brick.

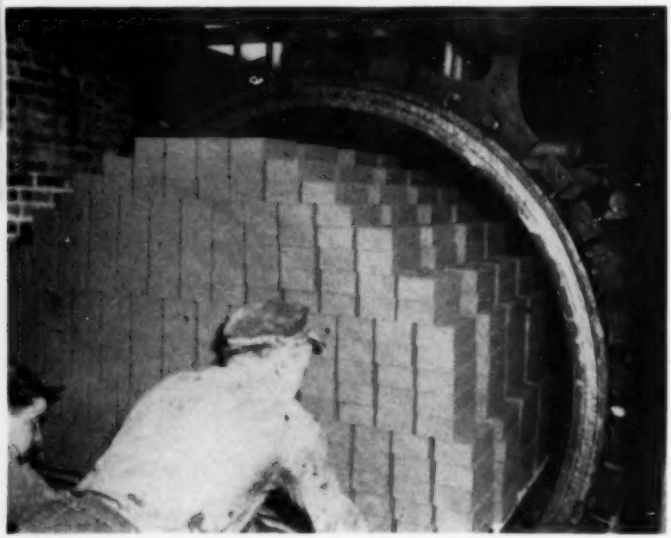
• Each of the two crushing wheels of the roller mill weighs 1,800 lbs. Note the plows in front of the wheel.

Plant feed from the storage pile is reclaimed and selectively blended with a drag bucket powered with 2-drum electric hoist. It is screened in a revolving trommel with ½-in. mesh openings and the undersize is conveyed into a 10-cu. yd. volumetric measuring hopper. An air-actuated trip lever on this hopper shuts off the charging conveyor when the hopper is filled to a predetermined level.

The batch is then dumped into a 10-cu. yd. revolving drum-type mixer and mixed at least half an hour. During the mixing cycle about 4 percent, by volume, of pebble lime is introduced into the batch. According to Carl Mendius, superintendent of Silbrico Corp., the lime acts as a catalyst that speeds up the aging process in which the basic bond, $CaSiO_3$, is converted to $CaCO_3$.

The mixer discharges onto a turn-

(Continued on page 213)



• Loading one of the high-pressure steam autoclaves, in which the bricks are cured for 24 hours. Each unit will hold 20 kiln cars, or 20,000 bricks.

I. N. O. S.—one of world's largest concrete pipe manufacturers

By GEORGE W. HOFFMAN

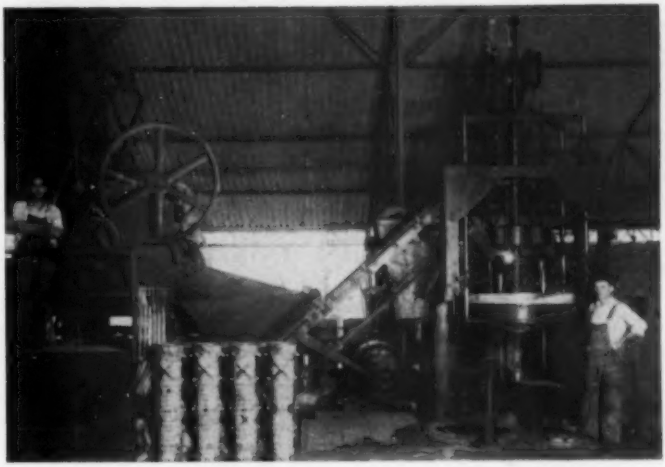
IN mass production of precision-made concrete pipe we know of many American plants recognized for top efficiency and production capacity. It therefore may come as a surprise to know that not one of these American plants, not even a combination of some of the largest of them together are making as much concrete pipe as I.N.O.S.

I.N.O.S. stands for Instituto Nacional de Obras Sanitarias, which means it is the Venezuelan Government's National Institute of Public Health. I.N.O.S. is an offspring of Nelson Rockefeller's Institute of Inter-American Affairs, which was formed at the outbreak of the World War II to cushion the impact of our assistance to South America in an attempt to create an advanced line of defense against the Nazi onslaught spearheading through North Africa and the southern half of our American continent.

Then, when toward the end of the war the machinery of Washington's Bureau of Inter-American Affairs was liquidated, the Health & Sanitation Division was preserved by mutual consent of all American Republics. The direct result was the creation of individual, cooperative public health departments in each nation. I.N.O.S. is just a branch of that department in Venezuela.

From small beginnings I.N.O.S. grew rapidly into a giant national institution because Venezuela is one of those progressive nations which does not concentrate its polish and advancement at its national capital only. In Venezuela there are many such capitals, economically speaking. From them all over the land a tightly-knit web of health and sanitation efforts spreads across barren wastelands and tropical forests.

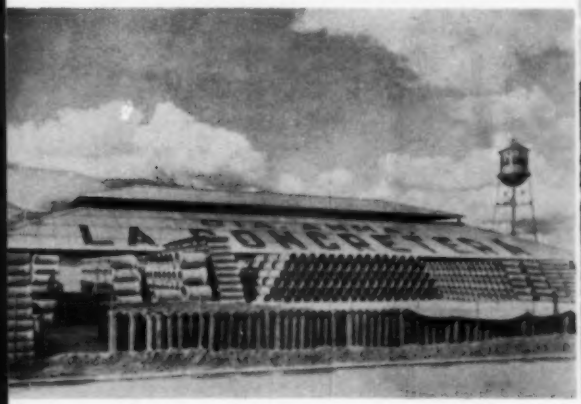
The branch of this health and sanitation work for sewage disposal, the drainage of swamplands and water supplies, constitutes its remarkable effectiveness because of the strategic location of concrete products

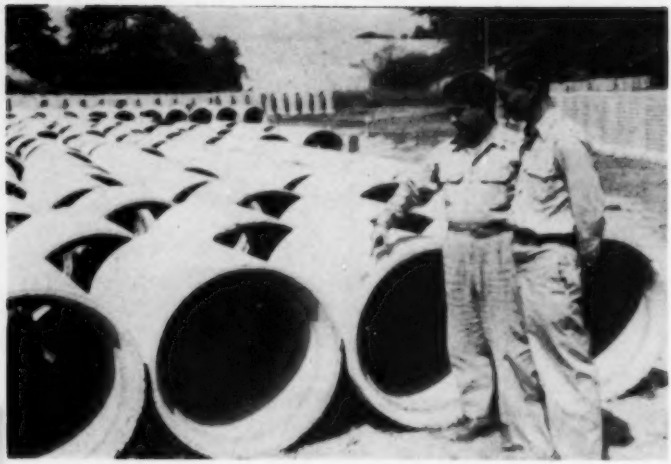


• A mixer and pipe machine installation in one of the plants described in this article. In the foreground are pipe molds waiting to be filled.

• Right: A part of the I. N. O. S. storage yard of pipe at the Cumana, E. Venezuela, plant.

• Below: The plant and yard of La Concretera at Caracas.





• An I.N.O.S. inspector and Gus Rotundo of Rocal C. A. on a pipe inspection tour.

• Right: The highway between La Guayra and Caracas, with drainage under construction by I.N.O.S.

plants throughout the country. All of Venezuela's piping, except for some small-diameter water pressure lines, are made from concrete. The large-diameter water mains are of the lock-joint type. Sewage disposal and drainage systems are all of standard concrete pipe, plain for 4-in. to 21-in., and steel wire reinforced from 24-in. up. All of Venezuela's concrete pipe is of the McCracken type, except for some of the large-diameter sizes which are made on vibrated hand-cast Quinn forms. McCracken type concrete pipe is the official national standard of I.N.O.S. according to its comprehensive manual, a book that exceeds in completeness anything else ever published on the subject anywhere. It is a pattern accepted as such by most Latin American governments, and has an authority equal only to that of our own American A.S.T.M. specifications.

There are at present eight McCracken plants operated by I.N.O.S. throughout Venezuela. Two additional independent McCracken plants in operation there, "La Concretera" in Caracas and Rocal C. A. near La Guayra and in Coro, deliver about 95 percent of their large production capacity to I.N.O.S. on a contract basis.

Actual production figures of pipe made in Venezuela are not available, but I have seen their plants working double shifts all over the country and I have checked stock inventories that added up from 50 to 100 thousand lengths of McCracken pipes of different sizes in the yards of most of these plants.

Building construction is going on everywhere in Venezuela; there are endless lines of corrugated concrete pipe lining the highways and byways. They string across the land beyond the fringes of the last ranchos or village outskirts, because I.N.O.S. builds not merely for today or tomorrow. Its leaders are planning for the future, when village or city limits of today will be right in the center of the town. I have seen that happening in some cities of Venezuela between my frequent visits there over the last ten years.

The management of I.N.O.S. is in the hands of young engineers throughout its vast organization. One of the reasons for its phenomenal success may be due to the fact that these men are being paid more than twice the salary which an average American sanitation engineer may hope to draw here. (Besides, even the highest salaries are taxed to a limit of 1½ percent total maximum only). Needless to say, the calibre of the engineers and personnel is of the highest. Their work is the closest to perfection that I have had the opportunity to observe.

Making good concrete pipe fast and perfectly could be accomplished only by the use of American machinery and production methods. We are proud of our own national industries, but is also gratifying to know that other countries have benefitted to such a large extent as Venezuela did through I.N.O.S., truly the world's largest manufacturer of concrete pipe.

Pacific Coast Aggregates Expands Ready-Mix Business

Pacific Coast Aggregates, Inc., of San Francisco is enlarging its ready-mixed concrete activities in the San Francisco Bay area.

Recently it took over on a lease arrangement the batching facilities of the South City Lumber & Supply Co., South San Francisco, and those of the Hayward Building Material Co., at Hayward, Calif., near Oakland.

Personnel changes announced recently by the company include the promotion of E. J. Goodpastor to senior vice-president, and the advancement of Richard K. Humphries to vice-president and general manager.

T. F. Lucas of Roanoke, Va., was elected president of the Virginia Ready Mixed Concrete Association, which held its annual meeting in that city during February. Other officers chosen included the following: T. C. Laramore Jr., vice-president; J. F. Ingoldsby, secretary; and J. W. Mitchell, executive secretary (re-elected).

"Retired" Detroiter Establishes 2500-Unit-per-Year Tank Business

By C. W. LYMAN
Portland Cement Association

FOUR years ago, John G. Francis retired from the Detroit city fire department. Despite his long service as a fire fighter he was still a comparatively young man, who had no desire to live out his years in idleness. Even more important, though, was his desire to establish a business for his two sons to enter when they were released from the armed forces.

Mr. Francis had no particular training for the business he was about to launch except natural ability and a willingness to work hard. He also had a wife with good business sense who agreed to handle the office work.

Out of this combination of circumstances grew the Superior Septic Tank Company, located at the northwest city limits of Detroit, which now manufactures 2,500 septic tanks a year. It is one of the most unusual success stories in the concrete products field.

It was in December, 1945, when Mr. Francis started his septic tank business. Having limited capital, he began by casting tanks on the job with his own small mixer and forms. Today his plant consists of an office building, a casting shop and a machine shop, and his equipment includes three 2½-ton trucks, a fork lift truck for moving and loading the tanks, a heavy overhead crane for handling tanks in the shop, and metal forms for precasting.

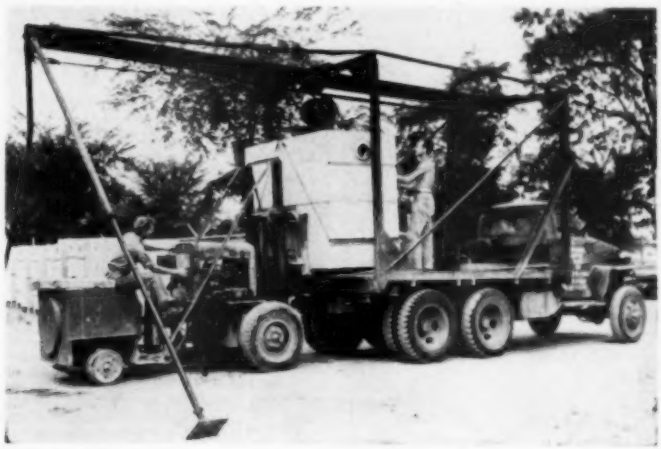
• A part of the office and plant of the Superior Septic Tank Company, Detroit, Mich., with samples of the finished product at the left.

Because the plant is highly mechanized, there is no heavy lifting for the employees, and the work is simplified to such an extent that breakage of newly-cast sections is virtually eliminated.

Originally, Mr. Francis used plywood forms, but these proved uneconomical. When his oldest son Jack returned from service in 1946, the latter and the plant mechanic, John Benart, designed steel forms for both 500- and 1,000-gallon sizes. Only recently they completed the building of forms for 750-gallon tanks.

Bottom sections for the two smaller sizes are cast bottom up and turned over mechanically. The grooved joint around the top is painted with asphalt and the top section is lowered into place by the overhead crane. Joints are sealed tightly with a cement-and-mortar grout.

Both the 500- and 750-gallon tanks are delivered in one section, ready for installation in the ground.



• A fork lift truck loading tanks for shipment. This truck has a traveling overhead hoist for unloading.

• John G. Francis Sr., founder of the Superior Septic Tank Company.

• Completed tanks being stored in the yard by a fork lift truck.

The 1,000-gallon tanks are lowered in two sections because of their weight. The company also constructs tanks of larger than 1,000-gallon capacity for schools, industrial buildings, institutions, etc., but these are cast in place.

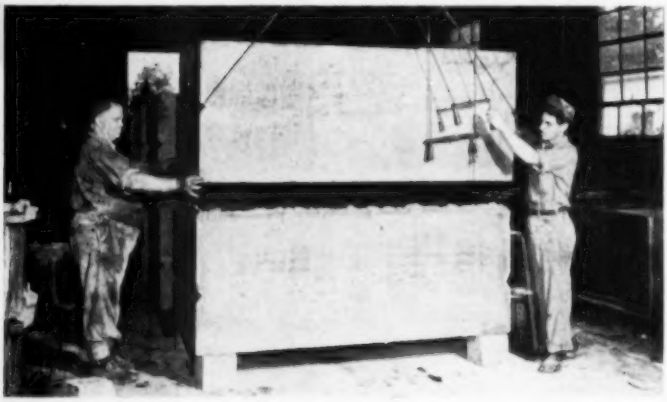
The fork lift truck is capable of moving and loading both the 500- and 750-gallon tanks completed, but the 1,000-gallon tanks have to be loaded in two sections. The weight of the tanks varies from 5,200 lbs. for the 500-gallon size to 12,000 lbs. for the 1,000-gallon capacity.

Eight tanks can be cast at one time in the plant. They are removed the first thing each morning and are strong enough for immediate delivery because of the use of high-early-strength cement.

All tanks are rectangular and are designed to meet the approval of both the Michigan State Health Department and the FHA. They also comply with health ordinances of Wayne and adjoining counties, which specify that all septic tanks must be concrete.

Much of the area adjacent to the plant is outside the city limits of both Detroit and Pontiac and hence without sewage disposal facilities. The firm numbers among its customers several large home building contractors, but the bulk of its business comes from individual home owners. Mr. Francis is equipped to make complete installations of his tanks, including tile fields and plumbing, but in most instances he just delivers the tanks to a prepared hole in the ground.

Gerald, the younger son of Mr. and Mrs. Francis, now is associated with the firm. He and his brother handle most of the details around the plant, leaving their father free to solicit new business.



• Assembling the top and bottom sections of a tank by means of an overhead crane. Joints are then sealed with a cement mortar grout.

Champaign, Ill. Concern Installs Concrete Mix Plant

In recent weeks the Somers-Barr Company of Champaign, Ill., installed a new concrete mixing plant manufactured by the C. S. Johnson Company. The following installations are main features:

The 100-cu. yd. four-compartment bin has a central compartment capable of holding 155 bbls. of cement. A 3-cu. yd. concentric batcher handles the aggregate, and separate scale frames weigh the aggregate and cement.

The main mixer is a 2-cu. yd. Koehring non-tilt-type mixer, with facilities for weighing water. Cement and aggregates will be shipped in by rail. For transporting cement to the plant there is a screw conveyor; an under-track belt feeder handles the aggregate. Auxiliary ground storage has been provided for aggregate, as well as for cement.

The installation also included a 520-bbl. ground storage silo for cement. All materials can be brought from ground stockpiling through a conveyor system to the overhead bin.

Zane P. Laurini Appointed To Universal's Sales Staff

The appointment of Zane P. Laurini to the production and sales staff of Universal Concrete Pipe Company, 297 S. High Street, Columbus, O., was announced by H. X. Eschenbrenner, president.

Prior to World War II, Mr. Laurini was employed by the U. S. Engineering Department as inspector of heavy construction in South America and the West Indies. After four years with the U. S. Air Force, he joined the Bero Engineering Company at Buffalo.

The Dunham Concrete Company, Inc., Shreveport, La., filed articles of incorporation with the office of the secretary of state at Baton Rouge during the week of March 3, 1950, listing capital stock of $500,000.

Makers of Slag Face Brick

(*From page* 208)

table feeder which controls the rate of feed to a Bernhardi & Son roller crusher. Essentially, this crusher consists of two 1800-lb. wheels and a series of 5-prong plows. The mix is introduced in the center of a revolving dry pan and is pushed outward toward the periphery by the action of the plows into the path of the massive wheels. (See illustration.) The kneading action of the wheels will pulverize approximately 10 tons of slag per hour.

The crusher discharge is fed to two Bernhardi & Son brick machines, each of which will produce more than 2000 bricks per hour. These machines die-form the units, 2 at a time, and mold them under a pressure of 140 tons per brick. No pallets are needed. The newly formed bricks are loaded on kiln cars which are transferred via 39-in. gauge rails to high-pressure steam autoclaves.

About 20 cars or 20,000 bricks can be cured in one autoclave. Normally the bricks are steam cured for 8 hours under 120 p.s.i. of steam at 340 deg. F. Although the steam is discharged after 8 hours, the bricks are cooled in the autoclave for an additional 16 hours.

Upon withdrawal from the autoclave, a slag brick will withstand without fracture a compressive pressure exceeding 4000 p.s.i. It weighs about 4¾ lbs.

The natural color of the Silbrico brick is light gray. For red and buff colored brick, pure iron oxide is introduced into the mix—usually at a point in the manufacturing cycle just before the trommel screen. Top brick deliveries in Chicago bring between $33.50 and $38.50 per thousand.

Top officials in the Silbrico Corp. include Carl Mendius Sr., president; Tom Mendius, sales manager; and Carl Mendius Jr., superintendent.

Concrete Masonry in School Construction is the second booklet in a series issued by The National Concrete Masonry Association illustrating the many ways in which concrete masonry can be used effectively in different types of structures. The first to appear was *Concrete Masonry in Church Construction.* Others to follow during 1950 will be devoted to residences, multiple dwellings, hospitals and basements.

The management of the Massey Concrete Products Company has announced the recent removal of its general offices to 111 W. Washington Street, Chicago 2, Ill.

3000 READY-MIXED PLANTS ASKED FOR IT

a lighter, faster truck mixer... hundreds of dollars lower priced

FLUID DRIVE
(if you want it)

JAEGER "PAYLOADER"

2-3-4½-5½ YD. SIZES

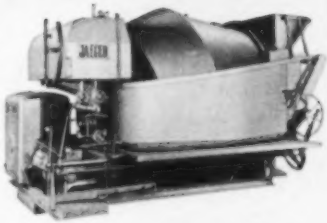
600 to 1600 lbs. weight reduction, meets strict load limitations: Yet sturdier, more rugged in frame and vital parts than ever before.

9 to 13 inches shorter, for better truck mounting: Less cab-to-axle requirement for short wheelbase trucks, correct load centering on all models for long truck and tire life.

Faster in operation — more trips, payloads per day: 10 seconds per yard to end-load dry materials with new hopper and high drum "charging" speed. Top-load wet material in one shot thru quick opening "toggle lock" door.

One wheel turn fully retracts hopper for discharge. High drum "discharge" speed thru Jaeger 2-speed transmission, plus low angle discharge cone and continuous blades, discharges 4" slump concrete at 20-25 seconds per yd., 1" slump in 60 seconds.

Pressure-jetted water distribution and 2-speed "Dual Mixing" with "Throw-Back Blades," insure higher strength concrete: The reason more concrete is sold by Jaeger Truck Mixers than by any other method.



50% LOWER MAINTENANCE COST . . . MORE HOURS ON THE ROAD

New "Spider" drum drive: Saves weight, insures an always self-aligning drum.

Unit power and transmission: A major improvement. Permanent gear alignment.

Instant opening, self-aligning hopper, long-life seal: Eliminates all end-loader headaches. One wheel-turn retracts hopper 9" for discharge. Self-centering drive pins hold it in positive alignment on roughest ground. Seal self-lubricated from 5 lb. grease reservoir. Seal replaceable in 30 minutes *without removing hopper.*

Ask your Jaeger distributor to show you these and many other Jaeger-engineered improvements—or send for complete Catalog TMH-10

THE JAEGER MACHINE COMPANY, Columbus 16, Ohio

AIR COMPRESSORS • PUMPS • MIXERS • HOISTS • TOWERS
AGGREGATE SPREADERS • BITUMINOUS PAVERS • CONCRETE SPREADERS, FINISHERS

Stone Mix Concrete Corp. Elects Officers, Directors

The Stone-Mix Concrete Corporation, Buffalo, N. Y., recently announced the following newly-elected officers: James M. Cranz, president and treasurer; Allen Brehm, vice-president and director; William G. Shoemaker Jr., secretary and assistant treasurer. Directors elected include: Raymond Brayer, Seymour Knox and Messrs. Shoemaker, Brehm and Cranz.

Paul W. Brehm, former president of the company, died on March 2 in Buffalo after an extended illness. In earlier years Mr. Brehm was associated with the Lehigh Portland Cement Company.

NEW MACHINERY and SUPPLIES

● Power Wheelbarrow

Principal improvement in the 1950 model "Moto-Bug", a power wheelbarrow manufactured by the Kwik-Mix Company of Port Washington, Wis., is a large steering wheel to replace the lever bar arrangement formerly used for guiding the unit.

The introduction of the steering wheel permits the operator to handle the machine in the same manner as an automobile and with the same ease. Steering gear ratio has been increased from 2 to 1 to 4 to 1. Sturdily built, the Moto-Bug has a rated hopper capacity of 10 cu. ft., or 1200 lbs. on the platform body. It is powered by a standard 4-hp. gasoline engine and travels at speeds of 1½ to 4 m.p.h., both forward and reverse.

● Lightweight Truck Mixer

Lighter weight, lower price, shorter length, faster operation and reduced cost of upkeep are the advantages claimed for the Jaeger "Payloader" model truck mixers. Weight reductions ranging from 600 lbs. in the 2-cu. yd. model to 1600 lbs. in the 5½-cu. yd. size have been effected by design improvements, to comply with strict load limitations while carrying larger payloads. Reductions of 9 to 13 in. in frame length, with shorter cab-to-axle requirements and load center farther forward, facilitate mounting on short

wheelbase trucks and the most advantageous load distribution on all truck sizes.

Faster end-loading of dry materials is obtained by a new hopper design and ability to revolve drum at high speed while charging. Pre-mixed or shrink-mixed materials can be charged in one drop through a top door in the drum, which is equipped with new quick-opening toggle lock. Two-speed transmission permits revolving the drum at high speed for fast discharges, assisted by continuous spiral discharge blades and a flatter drum discharge cone. Rate of discharge is said to average 20 to 25 seconds per yard of 4-in. slump concrete, 60 seconds per yard with 1-in. slump material.

Continuous self-lubrication of the hopper seal is provided from a built-in

Announcing THE New UNIT 614 ½ Yd.

a HEAVIER and BETTER machine ...at no increase in price!

Sturdy, box section side members . . . Cast steel hinges . . . Single, square structural steel dipper stick . . . Cast steel saddle block with adjustable and replaceable wear plates . . . Direct UNIT chain-crowd mechanism — eliminates cables, racks, and pinions . . . Special equalizer insures even pull on both strands of the double crowd-chain.

Twin hook-rollers equalized and mounted on front and rear of rotating frame. Quickly adjusted by means of eccentric pin. 4 upper-load rollers and 4 hook-rollers — all conical shaped and made of drop-forged steel.

The completely new UNIT 614 — ½ yard offers the same rugged construction usually found only in machines of greater capacity. Twenty-five years of engineering skill and craftsmanship have gone into the production of this model — an outstanding product resulting from specializing in sizes under one yard. Compare its construction features and design with any ½ yard machine in the market today. We are confident that your judgment will favor the UNIT 614.

Get the facts — Write today for literature.

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grease reservoir of 5-lb. capacity, which is refilled periodically by an attached high-pressure grease gun. The seal, which is said to be leakproof and exceptionally long-wearing, can be replaced in 30 minutes without removing the hopper.

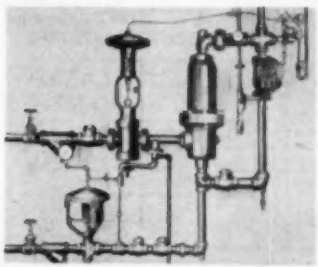
The Payloader models are offered in 2-, 3-, 4½- and 5½-cu. yd. sizes as truck mixers and 3-, 4¼-, 6⅛-, and 7⅝-cu. yd. sizes as agitators. "Sealed drum" models with air-tight rear discharge door are available for wet-mix plant operation. Manufactured by The Jaeger Machine Co., Columbus 16, O.

● Continuous Mixer

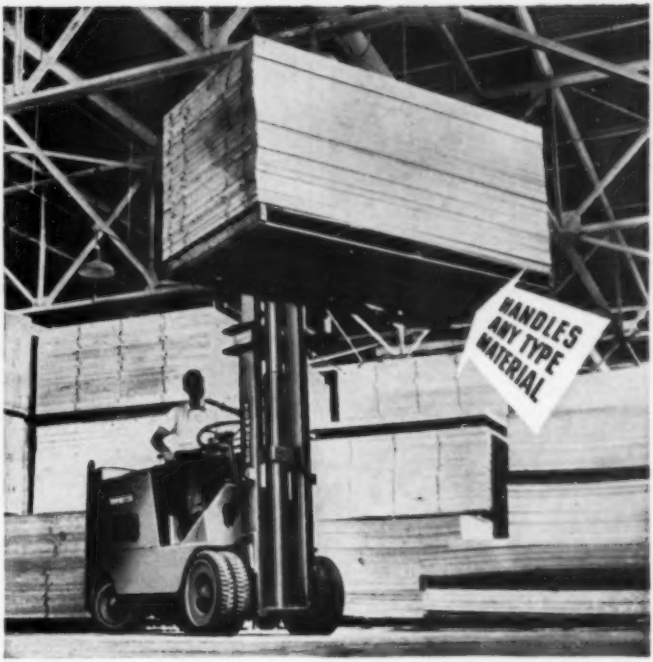
A new type of continuous mixer has been put on the market by the Yoder Co., Cleveland 2, O. It incorporates a vibrating belt feeder, which automatically reduces the aggregates to constant volume, regardless of moisture contents. Thus, it is said to afford the same accuracy as is obtained by using weighing equipment, and the need for constant moisture determinations is entirely eliminated.

Other advantages are non-clogging, positive feed of both cement and aggregates into the mixer, and from the mixer to the block machine, so that a constant head of well-mixed concrete is maintained above the largest block machines.

By tests and experiments, it was found that the best mixing action was obtained by placing the mixer blades at different angles. One blade is attached almost parallel to the shaft, and the next one at an angle of about 55 deg. from the former. This arrangement is repeated throughout the length of the mixer shaft. In operation, one mixer blade lifts the mix and propels it slightly forward with a fluffing action. The next blade cuts through the mix and propels it slightly forward, so that a double lifting-and-cutting action takes place throughout the length of the worm. It results in a total of about 2000 agitations in the passage through the mixing barrel in five minutes.



Savings up to one-third or more in hot water costs are claimed for the improved Pick steam injection heater. Its maker, Pick Mfg. Co., West Bend, Wis., says that the unit furnishes a dependable supply of hot water at constant uniform temperature. The injection of steam is accomplished without water hammering. Temperature adjustment is instantaneous and is automatically regulated for large or small quantities of water as needed.



Tested and proved-

for more time on the job

Every powerful Towmotor model is at peak performance 24 hours a day—to keep materials flowing smoothly and without interruption in your plant. There is no letdown in speed or power . . . no "time out" to be revived. Compare Towmotor with any other fork lift truck and you will see why Towmotor's time-tested features make every Mass Handling job easier, faster, safer. 12 models plus many standard and specially designed accessories handle all type loads from 1500 to 15,000 lbs.—a Towmotor for every job. Write for a copy of "Handling Materials Illustrated." Towmotor Corporation, Division 13, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all Principal Cities in U. S. and Canada.

SIMPLICITY OF DESIGN

—another Towmotor efficiency feature

Guts—not gadgets—is the secret of Towmotor's stamina. Eliminate *down-time* . . . increase *operating* time on your toughest mass handling jobs!

Ask to see the Towmotor Movie, "The One Man Gang," right in your office.

every handling job is easier with TOWMOTOR MH!

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

Vento Steel Basement Windows are available in three sizes and two types — CHAMPION and Thrifty — covering two different price brackets.

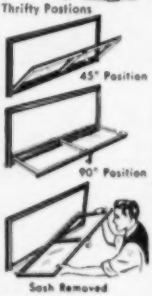
CHAMPION Window Positions

CHAMPION

Heavy steel channel frame, welded throughout. Made in three sizes —available with storm sash and screen. Double-contact construction blocks wind and rain. Can be opened partially or fully (*right*).

THRIFTY

New "economy" Vento Steel Basement Window. Made for quality residential and commercial building at minimum cost. Heavy hot rolled steel, riveted construction. Three sizes — other features same as Champion Window, above. Two open positions (*right*).



VENTO STEEL LINTELS

For quick, neat construction with standard-size cement blocks. Provides groove for anchoring steel window. Width — 7"; length from 2' 6" to 5' 6". Excellent finished appearance.

Cash in . . . on the *big profit opportunity* offered by these VENTO products!

Write or wire today for complete details, including information on territories still available.

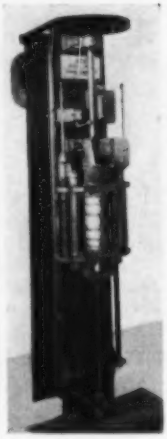
VENTO STEEL PRODUCTS CO., INC.
254 COLORADO AVE., BUFFALO 15, N. Y.

● Truck Mixer

The T. L. Smith Co., Milwaukee, Wis., has developed a new series of LOAD LIMIT truck mixers which are

said to haul full rated truck mixer payloads and still meet the highway load limitations imposed by most states. Reduced weight is accomplished through the elimination of parts and assemblies which are not basic or necessary to mixer operation. Yet quality and performance are said to be unimpaired. Conversion is easy, in the field. A LOAD LIMIT model can be quickly changed to a standard truck mixer or agitator, and *vice versa*. A standard model can easily be converted to a LOAD LIMIT model. The new machines are available in 2-, 3-, 4½-, and 5½-cu. yd. sizes, with higher ratings for agitators.

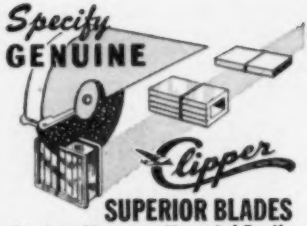
● Heavy-Duty Drain Tile Machine



Dugas and Company, 960 Marietta St., Atlanta, Ga., has developed a new heavy-duty drain tile machine known as the "Ace." This machine which is constructed on a 12-in. H steel column, takes up only 1 sq. ft. of floor space. When the H-beam is set in the concrete floor, the machine is said to be absolutely rigid and vibrationless.

This machine features a packer-type combination head and packing shoes which are cast in one piece to assure a perfectly formed tile. Power is provided with a 1200-r.p.m. electric motor. The air cylinder is oversize, of positive action, and is precision mounted.

Capacity of the machine ranges from 250 drain tiles per hour to better than 5 units per minute with a trained, fast crew. The Ace has very few wearing parts, a factor which tends to reduce maintenance.



SUPERIOR BLADES

Cut Any Masonry Material Easily

Regardless of hardness . . . there's a GENUINE Clipper Superior Blade to cut any masonry material with perfect smoothness and real economy.

Measuring selected abrasive for Clipper Superior Blades requires the care of experts.

Infinite skill is required in the hydraulic pressing of Clipper Superior Blades.

YOU CAN DEPEND ON CLIPPER SPECIFICATIONS

Every Clipper Blade is the result of constant research and is recommended with expert knowledge of masonry materials. When you have the *correct* GENUINE Clipper Superior Blade or Clipper Bonded Diamond Blade for WET or DRY cutting you'll find it easy and economical to slice thru the hardest materials.

Attaching blotters to Clipper Superior Blades after individual selection and testing.

Cartons or Cases . . . Clipper Superior Blades are packaged for convenience and protection.

SOLD ONLY . . . DIRECT From CLIPPER FACTORY BRANCHES

Because of the tremendous variety of masonry materials the correct Clipper Blade for your . . . Brick-Tile-Stone or Concrete Product . . . can *only* be recommended by *masonry Specialists!* "SAME DAY" Shipment from 9 Clipper Branches or the EXACT Specification for any material . . . WRITE TODAY and mention the material!

GENUINE CLIPPER BLADES

. . . Over 57 Specifications

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Austin, Tex. PH 8-6085	Chicago FR 2-5732	Pittsburgh AT 1-2040	New York MU 7-8400

● Block Fork

The Liftall Hydraulic block fork is a modification of the well known Liftall brick fork which has been in service for more than five years.

Although the unit was developed for standard size brick, it handles the large silo block, as illustrated in the photograph.

The hydraulic fork has unusual safety features in that the gripping

pressure cannot be released or changed in any manner until the load is set down on a solid foundation; also, the fork is equipped with automatic hold-grippers (or load stabilizers) to bind the top of the load securely while traveling over rough ground. The 1½-in. thick rubber grippers give maximum protection to the material being handled, and breakage losses are cut to the minimum. The loads may be handled several times without damage. Forks are available in lengths up to 48 in. Liftall Corporation, 2007 Baltimore, Kansas City, Mo.

● Prefabricated Steps

Roger F. Williams Company, 3420 S.W. 9th Street, Des Moines, Ia., has developed molds for sets of prefabricated, steel-reinforced concrete steps in 4-, 5-, or 6-ft. widths. The steps can be furnished with from one to seven risers, and as steps only or with a 42-in. platform.

The finished products are known as "Homeward Steps."

As indicated in the illustration, the steps have built-in rustproof sockets for attaching ornamental iron railings. The Roger Company is the licensor for the molds.

10,000 P.S.I. in 28 days The VIBRO Way

Saving a bag of cement per cubic yard of concrete

More than 75 % of form costs...

A recent job involving the manufacture of 1400 heavily reinforced concrete gratings for Airport drainage, obtained these results by using two VIBRO-PLUS TOP DOG VIBRATORS. Two forms produced thirty (30) castings a day.

To avoid the entraining of air, a harsh mix of 2.2 gals. of water per sack of portland cement was used. The problem of distributing the concrete was an acute one, because of the heavy reinforcing and resulting small pour space. Two VIBRO-PLUS Top Dog vibrators solved this problem by rendering the concrete in this mold fluid; and consolidated the dry harsh concrete mixture by PRECISION VIBRATION.

USES: Pipes, gratings, septic tanks, and other specialty forms, also chutes, bins, hoppers.

Write us for specific information as to your particular vibration problem; and free booklet.

MAIL THIS COUPON TODAY!

VIBRO-PLUS PRODUCTS, INC. Dept. P-10
54-11 Queens Blvd.
Woodside, L. I., N. Y.

GENTLEMEN: PLEASE SEND YOUR FREE TECHNICAL BOOKLET ON CONCRETE VIBRATION.

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VIBRO-PLUS PRODUCTS, INC.
54-11 QUEENS BLVD
WOODSIDE L. I. NEW YORK

It's Economical...It's Practical... It's Built for the Job!

Baughman **BULK CEMENT TRANSPORT**

Designed specifically for cement transport. Low in cost because of modern engineering and production methods. Built of high tensile alloy steel for more strength with less weight, giving MORE PAYLOAD. Waterproof manholes spaced for capacity loading. Catwalk top . . . climbing ladder. Electro welded throughout. Available in 15' to 33' lengths.

Self-Unloading..

Twin screws give fast action . . . covered with special air cells for easy starting and high speed discharge. Equipped with powerful motor . . . all controls conveniently located on outside of body. Simple . . . positive . . . immediate.

Write for full details on the Baughman Line of transport bodies and conveyors.

BAUGHMAN MANUFACTURING CO., Inc.
551 SHIPMAN ROAD JERSEYVILLE, ILLINOIS
"There is a Baughman Distributor Near You"

AIR VIBRATORS

Type "F"

LOW COST AIR VIBRATORS GUARANTEE STEADY MATERIAL FLOW OR SETTLE CONCRETE MIXES

Powerful hammer-like blows delivered by CLEVELAND Type "F" air vibrators prevent arching-over and plugging in bins, hoppers and chutes. These dependable units have been designed for use on all types of hoppers and bins handling sand, cement, cinders and all other granular materials.

Type "LSRR"

LSRR air vibrators utilize cast steel male wedge type mounting bracket which fits the female bracket that is standard equipment on most covered hopper railroad cars. In addition, female brackets can be furnished for attachment to bins, concrete forms, chutes, etc., and a single LSRR vibrator can be moved from one installation to another to handle several different applications.

Type "VG"

New vibrators featuring a portability and rapid, easy attachment to wooden studs or metal structural members are now available. These units are recommended for use on concrete forms, hoppers, bins, dump trucks, etc. to settle or shake-out their contents.

Type "UH"

These CLEVELAND air vibrators and many others are illustrated and described in the new CLEVELAND VIBRATOR catalog. Write today for your copy.

THE CLEVELAND VIBRATOR CO.

2711 CLINTON AVENUE

CLEVELAND 13, OHIO

● Air-Entraining Agent

A new and improved air-entraining agent has been recently developed by Autolene Lubricants Co., 1331 W. Evans Ave., Denver, Colo. The new product, "Protex", has been developed for ready-mix companies and block plants, but is equally valuable to concrete contractors and pipe plants.

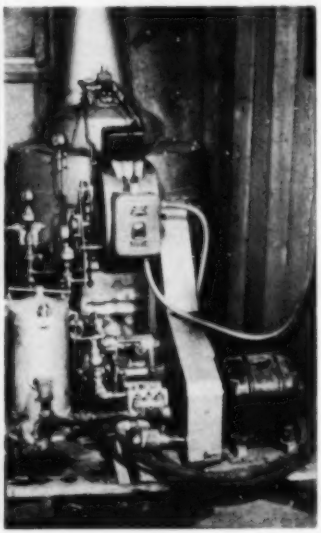
The basic agent in Protex has been tried and proved since it has been widely used by U. S. Government agencies and A.G.C. contractors. The product reportedly will not settle out and assures uniform results, eliminating operating difficulties. It is a liquid which, when added to the concrete mix, entrains millions of near-microscopic, non-combining air bubbles which are equal in volume and size to 200-mesh and are evenly dispersed throughout the mortar phase of concrete.

● Steam Generator

Littleford Bros., Inc., 457 E. Pearl Street, Cincinnati 2, O., has put on the market a device known as the "Kwik-Steam" vapor generator. With this generator, the manufacturer declares, it is possible to produce steam in two minutes. It was designed for steaming aggregate for ready-mix, heating for curing concrete blocks, operating steam hoists, etc.

In principle the Kwik-Steam is a coil-type device, not a boiler. Automatically controlled, the generator burner cycles off when steam is not needed and on again when steam is required, thus effecting a considerable saving. After the generator is started, automatic controls take over to keep a predetermined steam pressure at all times.

Another advantage of the Kwik-Steam is that it uses low-cost fuel oil. It reportedly gives full combustion, thereby promoting smokeless operation. Safety in operation is achieved by "fool-proof"



READY MIXED OPERATORS!

YOUR FILES ARE INCOMPLETE

unless you have the BUTLER Ready Mixed Plant Catalogue. It shows a wide variety of plant installations, layouts and complete descriptions of BUTLER equipment. Send for it. Ask for Bulletin 185.

Butler Bin Company

987 Blackstone Ave.
Waukesha, Wisconsin

DRY WALLS

Interior or Exterior
Above or Below Grade

Eliminate costly guess work in solving wet wall problems. Seal and beautify porous walls of concrete block, tile, stucco, etc., with Spray-O-Bond Concrete Sealer. It's easy to apply — almost like brushing on paint. Used successfully by contractors for over 20 years. A post card will bring you the name of your nearest dealer.

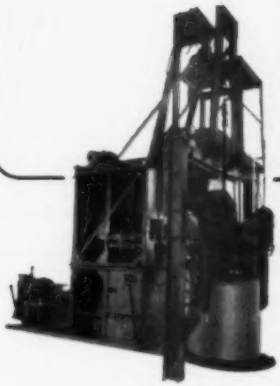
SPRAY-O-BOND COMPANY
2225 N. Humboldt
Milwaukee 12, Wis.

spray-O-bond

yes, you can

Buy or Lease

this Universal Concrete Pipe Machine



★ You needn't lay out the purchase price to begin enjoying the production and profits of this great machine. Leasing arrangements are possible on terms that assure profitable operation. The Universal Pipe Machine has set new higher standards for efficiency. It makes more pipe and better pipe with fewer man hours. Because it true-tamps at the incredible rate of 680 strokes-a-minute, you use a drier mix, get stronger pipe that handles with less damage, requires minimum curing. One of the four sizes (5"-24", 6"-48", 12"-60", 24"-72") will meet your requirements. Ask about the *Universal Lease Plan.*

UNIVERSAL CONCRETE MACHINERY CO.
297 South High Street Columbus, Ohio

automatic controls. The generators are made in sizes producing from 500 lbs. to 4000 lbs. of steam per hour. There are no fire-tubes, grates, crown sheet or fire box. Operating pressures can be regulated between 75 and 300 lbs. p.s.i.

● Electric Lift Truck

A special electric lift truck, "The Hydrolectric K" has been especially designed for moving loaded block racks into kilns, and bringing empty racks to the block machine. This machine has a special 36-in. square platform for side handling.

Manufactured by Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati, O., The Hydrolectric K includes such features as differential gear drive and sealed-in lubricant. The complete power unit includes twin-wheel drive, a heavy duty motor, two speeds forward, two in reverse and dynamic brakes.

Trade Notes

● The accompanying portrait unfortunately arrived too late to be published in the April issue with the announcement of Mr. Jones' appointment as sales manager of the Concrete Machinery Division of The Yoder Company. Mr. Jones was formerly active in the cement industry and in the machinery and equipment field. More recently he was connected with the Pioneer Materials Company of Pittsburgh, Pa.

PERMA-TILER . . . the Roof Tile Machine with the Skill BUILT IN

New PERMA-TILER Vibrator-powered Roofing-Tile Machine . . . semi-automatic action permits anyone to make up to 10 perfect tile per minute . . . no training or skill required.

Perma-Tiler is the ONLY semi-automatic roofing tile machine on the market that gives you:

- High production (10 tiles per min.) with low initial investment.
- Lowest labor cost—the machine does the work—no skilled workmen required.
- Smoothly troweled watertight machine finish—no after-treatment is ever necessary.
- Versatility—machines to make either French (modern streamlined) or Mission (half-round Spanish) types of tile.

Perma-Tile, as its name implies, is truly permanent inter-locking concrete roofing tile . . . weatherproof, fireproof, charming in its colorful appeal. Profits from your Perma-Tiler machine should, in a few short months, return the modest capital outlay required.

So, don't throw your money away on cheap, so-called "machines" that require long, painstaking training of operators. Nor need you go to the other extreme of spending $50,000 or more for a big, complicated array of equipment that requires a terrifying volume of roofing sales to justify its cost and operation. Instead, invest conservatively in a semi-automatic PERMA-TILER, the time-tested machine with the skill built in. Get all the facts TODAY!

PERMA-TILE CONCRETE PRODUCTS CO.
2201 Arrowhead Ave. San Bernardino, Calif.

DUST-FREE
TRUCK BATCHING

• A Sly Dust Filter will save you the dollars now lost in cement dust and greatly improve working conditions — assures clean truck mixers, clean yard and plant. Pleases the neighbors. Simple, inexpensive, easy to install, economical to operate — a paying investment. Send for Folder 84-H and quotation.

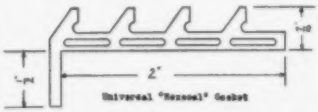
THE W. W. SLY MANUFACTURING CO.
4745 TRAIN AVENUE • CLEVELAND 2, OHIO

Multiplex Machinery Corp., Elmore, O., manufacturers of block machines and aggregate mixers have appointed James F. Satteson to their sales organization. Mr. Satteson will devote his attention to the sale of the company's new expanded line of automatic block machines and auxiliary equipment.

Towmotor Corporation, Cleveland, O., manufacturers of fork lift-trucks, tractors and accessories, has opened a new factory sales and service branch in Oakland, Calif. Gordon Winters, formerly in sales supervision work in Cleveland, will be in charge of the branch office. Mr. Winters spent several months on the West Coast surveying the territory and working out general plans for the further development of Towmotor sales and service there.

"Hexseal," a 100 percent crude rubber gasket for use in concrete sewer pipe joints, has been announced by Universal Concrete Pipe Company, 297 South High Street, Columbus, O.

When Hexseal gaskets are properly installed with dimensionally accurate concrete pipe the result is a flexible line that resists infiltration, exfiltration and roots.

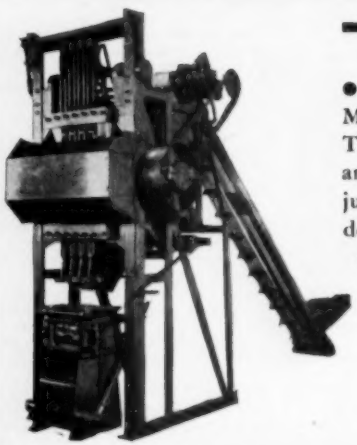


The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press Steel Pallets. Straublox Oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Bigstone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager **Columbus, Ohio**

Add *VIBRATION* to the MOLD BOX
—GET DENSER, STRONGER BLOCKS
—*IN INCREASED QUANTITIES*



• Kent Vibrator Attachment built in the Tamper-Stripper Machine insures a denser, more uniform, better textured block. This is due to a very efficient vibrating action of the mold box and cores of the Stripper. . . With the Vibrator working in conjunction with the Tamper, the rate of production is stepped up decidedly, thus reducing the cost per block. . . This valuable device is standard on all new installations. *To our old Tamper-Stripper customers, we offer rebuilt Strippers* with vibrators *in exchange* for the *old Stripper* at a nominal cost.

Since the *cost is small* compared to the results to be obtained, why don't you write immediately for complete information.

The **KENT MACHINE CO.** Cuyahoga Falls, Ohio
Manufacturers of CONCRETE PRODUCTS MACHINERY *Since 1925*

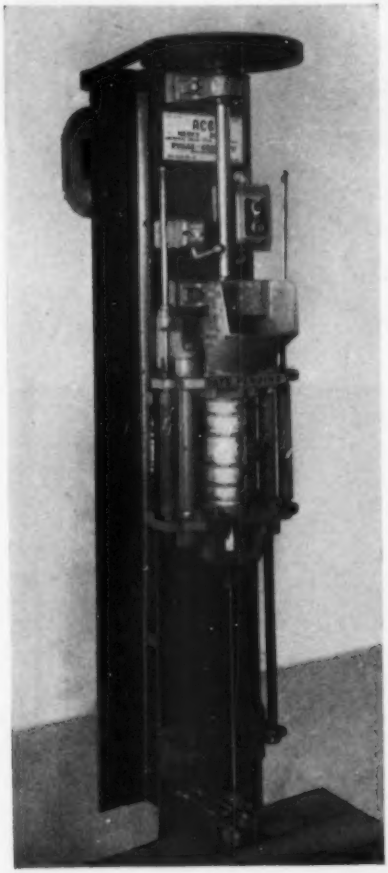
Announcing the ACE!

An Entirely NEW — Completely DIFFERENT — Concrete Drain Tile Machine

★ EASY TO OPERATE ★ LOW IN MAINTENANCE COST

★ NO GEARS ★ NO CAMS ★ NO CLUTCH

AND ITS ATTRACTIVELY LOW PRICE WILL SURPRISE YOU!



A glance at its specifications will tell you quickly that the ACE is the concrete drain tile machine you have been looking for. Developed after an extensive survey of the concrete pipe industry to determine what concrete products men wanted in a drain tile machine, the ACE features a Packer-type combination head and shoes cast in one piece to assure a perfect tile. GE or Westinghouse 1,200 rpm. ball-bearing motor and Stop and Go switch. Finest quality air cylinder, oversize, positive action, precision mounted.

The ACE is rigid and vibrationless through mounting all parts on a 12 inch steel H-type column secured in concrete. Requires only one square foot of floor space. Just push the switch, apply the air valve and the ACE is working for you making a product you'll be proud to sell.

WILL CONCRETE DRAIN TILE MAKE MONEY FOR YOU? *LOOK AT THESE FIGURES!*

FOR 2,000 CONCRETE DRAIN TILE
—A DAY'S PRODUCTION ON THE ACE—

28 bags cement	$25.20	2,000 Drain Tile sold at 8c each	$160.00
5 yards sand	12.50		
Labor	18.00		
Overhead	14.00	Production cost	69.70
YOUR COST	**$69.70**	**YOUR PROFIT**	**$90.30**

The average selling price of drain tile throughout the United States is 8 cents. And in many sections concrete drain tile sells as high as 15c each.

SEND FOR DETAILED INFORMATION TODAY!

We're interested! Please send us literature and prices on the ACE Concrete Drain Tile Machine.

Company .....

Address .....

City ..... Zone ..... State .....

Send to attention of: .....

DUGAS & COMPANY

CONCRETE DRAIN TILE MACHINES

962 MARIETTA ST.

ATLANTA, GEORGIA

SLASH! LABOR COSTS TO LESS THAN 1¢ PER BLOCK

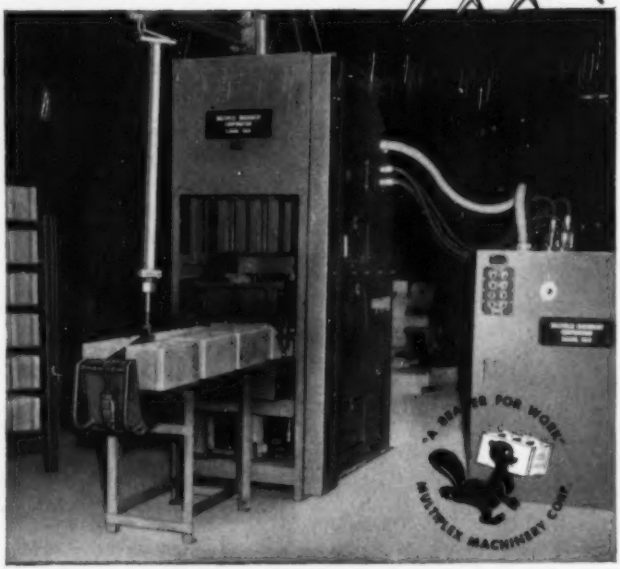
with the

MULTICO Block Master

HYDRAULICALLY POWERED - FULLY AUTOMATIC OPERATION

YES, you can really slash labor costs, break all production records, and fill orders faster and easier with the *Multico Block Master*. Just set the controls and the *Block Master* takes the aggregate, vibrates on pressure, then automatically tamps block to size, all in one operation—an exclusive Multico feature. Three men can run your entire plant—reduce overhead and produce finer quality Block faster. The *Block Master* is a standard production machine. The separate power pak can serve additional machines—another savings. The *Block Master* uses plain steel pallets, enabling you to produce any size or type of block desired.

THE MULTICO BLOCK MASTER PERMITS OPERATION OF AN ENTIRE PLANT WITH ONLY 3 MEN



EXCLUSIVE FEATURES

Separate Power Pak Control Cabinet

Pressure-Vibration Plus Tamping

Handles All Aggregates

Makes All Sizes & Shapes of Block

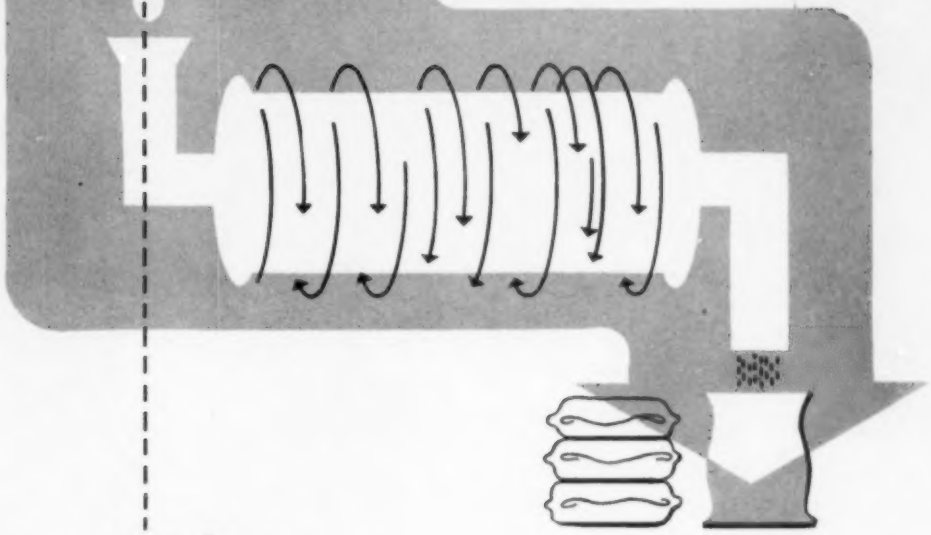
Write for Free Catalog or location of nearest machine in operation.

MULTIPLEX MACHINERY CORP. ELMORE OHIO

MANUFACTURERS OF BLOCK MACHINES • MIXERS • SKIP HOISTS • STRIPPERS • ELEVATORS

airalon

a new, ready-to-use air entraining agent . . .
and plasticizer for
Portland Masonry Cement



airalon

is a highly effective mixture of resin acids and fatty acids. It contains, in one easy-to-handle compound, the necessary ingredients to make a high quality masonry cement.

airalon makes masonry cement "fatter", more buttery. At normal air contents, Airalon improves water-retention and workability-retention. At lower than normal air contents, Airalon maintains present quality standards, with increased strengths when hardened.

airalon is economical to use. It enables the cement maker to produce his present quality masonry cement at lower cost . . . or to produce a higher quality masonry cement at no increase in cost. Because Airalon is added at the cement mill as received, in liquid form, it simplifies problems of inventory, handling, and storage. And because Airalon is a good grinding aid, it eliminates the expense of one.

airalon has been exhaustively tested in our own laboratories and in large commercial grinds . . . has the approval of ASTM under Cement Specification No. C175.

Dewey and Almy Chemical Company | CAMBRIDGE 40, MASS.
CHICAGO 38
MONTREAL 32

AIRALON T. M. OF D. & A. C. C.

Chip Costs...Not Blocks...

MOVE THEM WITH A YALE

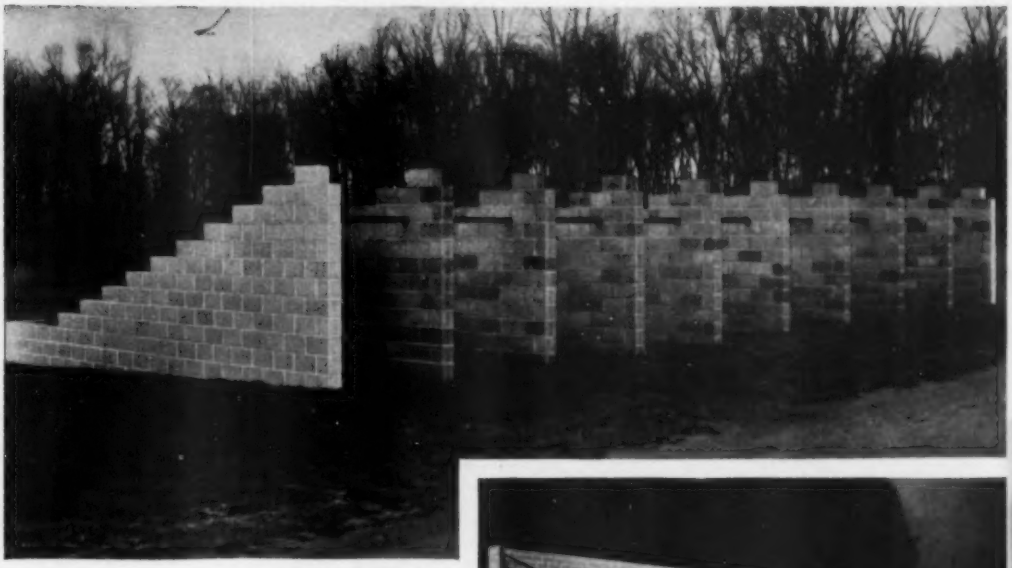
No more block-by-block rehandling and the breakage that goes with it! That's why more and more building block manufacturers are switching from muscle power to Yale power. One man and a Yale Truck can lift and transport dozens of blocks at a time. Costs are cut . . . breakage losses are kept to a minimum in the molding, curing and storage operations.

Easier, faster, safer, more economical block handling can be yours...get a Yale Truck. There are high lift and low lift models in capacities to suit *your* needs. Phone our nearby representative or write direct for literature. Do it today—pave the way toward lower costs, higher profits.

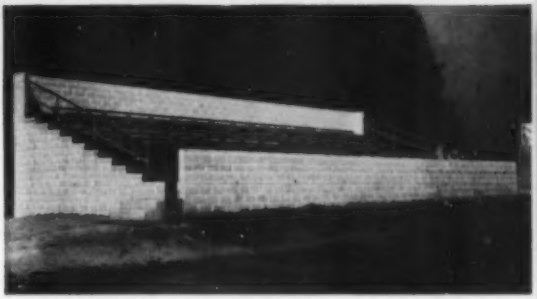
THE YALE & TOWNE MANUFACTURING COMPANY
ROOSEVELT BOULEVARD • DEPARTMENT K-30 • PHILADELPHIA 15, PA.

YALE
TOOLS THAT KEEP INDUSTRY "ON THE MOVE"

INDUSTRIAL DIAL SCALES • HOISTS—HAND AND ELECTRIC • TRUCKS—HAND LIFT AND POWER



Concrete blocks manufactured by
Powers Building Supply Co., Bucyrus, Ohio



One of the "thousand plus" uses for concrete blocks made with . . . LEHIGH AIR-ENTRAINING CEMENT

New or out-of-the-ordinary applications for concrete blocks are constantly being found. Many are off the beaten track . . . but ready for the manufacturer who looks . . . and sees. The small stadium shown here provides an interesting example.

In your own sales territory, a study of construction needs may reveal opportunities you never thought of before . . . if your blocks are of top quality and appearance.

Leading block manufacturers find Lehigh Air-Entraining Cement a factor in producing stronger, better looking units . . . . . with smoother plant operations and fewer culls and throwbacks.

If you are not already using Lehigh Air-Entraining Cement, try it with your own aggregate. You may find considerable difference in your costs at the end of a day's run.

LEHIGH CEMENTS

LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT
LEHIGH AIR-ENTRAINING CEMENT • LEHIGH MORTAR CEMENT

LEHIGH PORTLAND CEMENT COMPANY

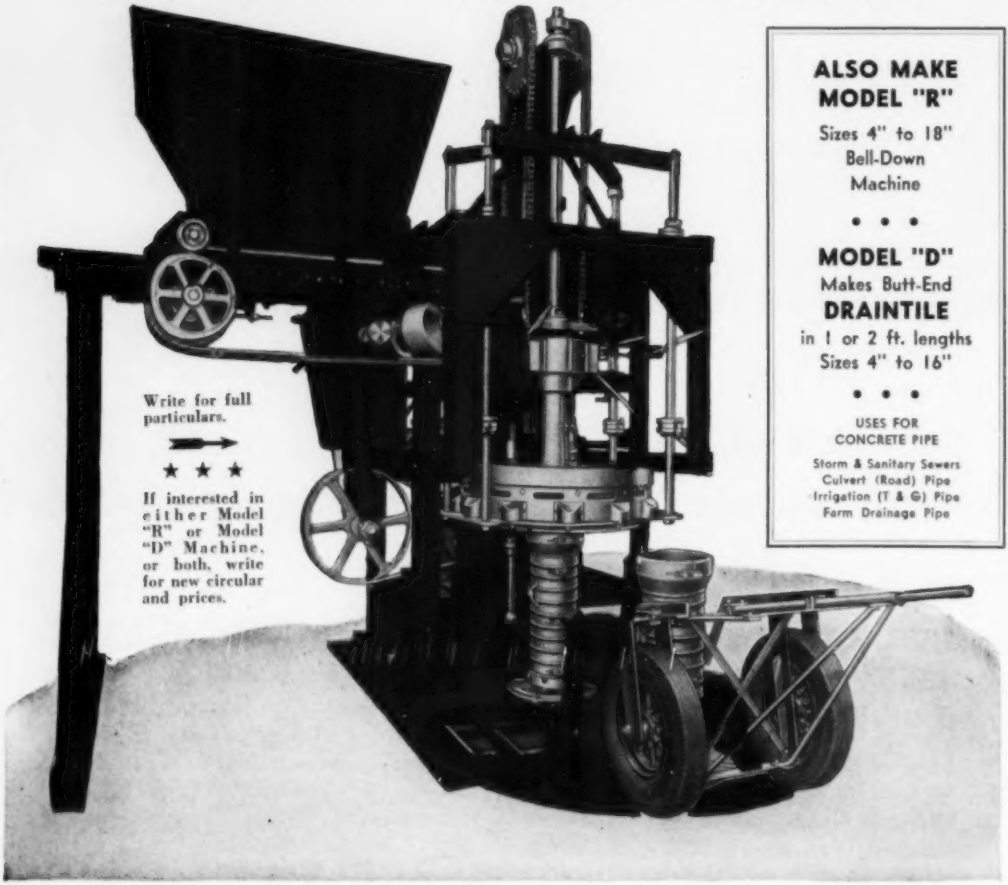
ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

Concrete Pipe Machinery Co.

MODEL "T" BELL-UP "McCRACKEN" MACHINE

FOR MAKING PLAIN AND REINFORCED CONCRETE PIPE

Range of Sizes—4″ to 36″—90% of the Market



Write for full particulars.

★ ★ ★

If interested in either Model "R" or Model "D" Machine, or both, write for new circular and prices.

ALSO MAKE MODEL "R"

Sizes 4" to 18"
Bell-Down
Machine

• • •

MODEL "D"
Makes Butt-End
DRAINTILE
in 1 or 2 ft. lengths
Sizes 4" to 16"

• • •

USES FOR CONCRETE PIPE

Storm & Sanitary Sewers
Culvert (Road) Pipe
Irrigation (T & G) Pipe
Farm Drainage Pipe

PACKER-ROLLER-HEAD PROCESS

LEADS THE WAY TO MORE PROFITABLE PIPE BUSINESS

Eight-Hour Shifts Produce:

SEWER
Plain B & S Pipe—

2400 feet — sizes 4″ to 10″
1750 " — " 12″ to 18″
1200 " — " 21″ to 24″

For Full Details Write to ↓

CULVERT "ROAD"
Reinforced T & G Pipe—

1600 feet — sizes 12″ to 18″
1100 " — " 21″ to 24″
900 " — " 30″ to 36″

EXPORT OFFICE
121 Broad St., New York (4), N. Y.

Concrete Pipe Machinery Co. — MAIN OFFICE —
Cable Address: Macpipe
Sioux City (19), Iowa, U.S.A.

ENGINEERING
YODER
MANUFACTURING

Compression Testing Machine

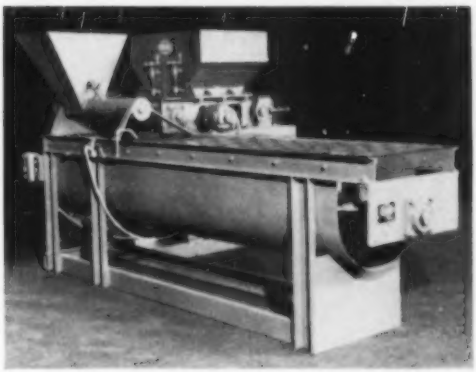
100-Ton Capacity
only $900.00
for Concrete Blocks and 6" Cylinders

Designed especially for quick and accurate on-the-spot testing in Concrete Products and Ready-Mixed plants, this machine meets all the essential requirements of the American Society for Testing Materials.

It is simple, safe, sturdy and accurate. Guaranteed by the Yoder Company, for 42 years leading manufacturers of high-precision machinery, and enjoying the highest reputation for advanced engineering, dependability, and fair dealings.

The price of this machine—less than half of what you have had to pay for a dependable machine of this size—makes it a most attractive investment for every concrete products manufacturer and ready-mixed operator who appreciates the great convenience and economy obtainable by doing their own testing.

With each machine are furnished simple directions for capping and testing, easily followed by any one unfamiliar with testing practices. A larger machine is also offered. Send for full description and specifications on both, explaining the many ways in which you can save money and make sure, daily, of quality mixes and products.



(Right) Yoder Continuous Mixer, with positive feed worm and vibrating belt feeder. Eliminates expensive constant weight feeders, weighing batchers, and moisture determinations. Insures constant volume to block machines, of any size. Ask for literature and further information. Investigate!

THE YODER COMPANY

Concrete Products Division

CLEVELAND 2, OHIO

Concrete Manufacturer Used Equipment Section

Advertising rate per issue: $10.00 a column inch. 10% discount for 4 consecutive issues. (Lower rates on a contract basis.) Advertisements received by May 22nd will appear in the June issue.

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(Good Guaranteed Equipment)
— All-Metal Forms for Precasting Concrete Shapes —

Burial Vaults
Fence Posts
Mail Box Posts
Street Marker Posts
Highway Sign Posts
Land Corner Posts
Stepping Stones
Precast Steps in 5' Lengths
Cattle Watering Troughs
Gutter Pipe in 2' Lengths
Adjustable Lintel Forms
Semi-Hollow Lintels
Septic Tanks
Floor & Roof Slabs in 20' Lengths
Silo Staves
Chimney Caps
Window Sills
Copings
Walls & Foundations
Concrete Pipe

Our prices are always the lowest for cash.

CHASE CONCRETE MACHINERY CO.
(LINCOLN 0918)
15 LINWOOD AVENUE BUFFALO 2, N. Y.

WANTED TO BUY

4 YARD STATIONARY MIXER, ALSO BATCHER.

SMITH-KELLY SUPPLY CO., INC.
P. O. Box 1566 Mobile, Ala.

WANTED

BRICK ATTACHMENT, 4 x 8 x 16" BLOCK ATTACHMENT, CATCH BASIN BLOCK ATTACHMENT FOR K-3 BESSER.

KENNETH L. ALLEN
Rochester, N. H.

WANTED

Clark Platform lift trucks (Model C only). State age, condition, & price.

FRIENDSHIP BLOCK & BRICK COMPANY
9970 Freeland Street TE 4-5300
Detroit 27, Michigan

FOR SALE

Established concrete products business in Michigan's growing Upper Peninsula for sale. Only plant in excellent market. New equipment 1948 to produce 1000 units day. Business now occupying fine building on reasonable lease, option to buy. Sale price based on actual assets only. Selling for reasons of health.

C. H. BOSLER
Newberry Concrete Products
Newberry, Michigan

CEMENT COLORS

All shades and grades the highest quality.
Write for color cards, prices and samples

RICKETSON MINERAL COLOR WORKS
MILWAUKEE 2, WISCONSIN
Established 1885

FOR SALE

REBUILT NO. 9 JOLTCRETE 4"-6"-8"-10"-12" attachments. Power carriage & off-bearer. Will furnish new 8" mold box to fit your pallets or ours. Reasonable.

Curtis Figg Walton Rd. Niles, Mich.

PRICED TO SELL

BRAND NEW BLOCK MACHINE
Mfg'r—Fabricating & Machinery, Inc.
Never Used
Vibrator Type — 2400 Blocks Per Day
With Steel hopper & 1,000 pallets
$1300.00

R. V. KNIGHT
Box 113 New Buffalo, Michigan

FOR SALE

1 STEARNS NO. 7 JOLTCRETE WITH 4, 8, and 12 inch ATTACHMENTS; ALSO BRICK ATTACHMENT WITH ALL THE PALLETS FOR THE ABOVE.

Box No. W 10, c/o Pit & Quarry Publications
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UNBREAKABLE PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

CONCRETE MANUFACTURER
RESEARCH DEPARTMENT
538 South Clark Street Chicago 5, Illinois

Please send me catalogs and prices concerning the following items checked below:

- ☐ Admixtures
- ☐ Air Compressors
- ☐ Air Entraining Agents
- ☐ Autoclaves
- ☐ Bag Cleaners
- ☐ Batchers
- ☐ Batching Plants
- ☐ Belting (Rubber)
- ☐ Bin Gates
- ☐ Bin Level Controls
- ☐ Bins and Batching Equipment
- ☐ Blades, Masonry Saw
- ☐ Block and Brick Machine
- ☐ Boilers
- ☐ Bucket Loaders
- ☐ Buckets, Concrete
- ☐ Buckets, Elevators
- ☐ Buggies, Concrete
- ☐ Bulk Cement Handling Equipment
- ☐ Bulk Cement Storage Plants
- ☐ Calcium Chloride
- ☐ Car Pullers
- ☐ Colors, Cement and Mortar
- ☐ Conveyors, Belt
- ☐ Conveyors, Portable
- ☐ Conveyors, Screw
- ☐ Curing Agents
- ☐ Curing Equipment
- ☐ Cutters, Bar
- ☐ Dispersing Agents
- ☐ Flooring Systems
- ☐ Forms, (Pipe, Joist, Ornamental, etc.)
- ☐ Guns, Color Spray
- ☐ Hardening Agents
- ☐ Heaters, Concrete Mixer
- ☐ Hoisting Equipment, Concrete
- ☐ Hoppers
- ☐ Joist & Slab Machines
- ☐ Kilns, Curing Concrete
- ☐ Lift Trucks, Electric
- ☐ Lift Trucks, Gasoline
- ☐ Lift Trucks, Hand
- ☐ Lightweight Aggregates
- ☐ Meters, Entrained Air
- ☐ Meters, Water
- ☐ Meters, Sand Moisture
- ☐ Mixers, Concrete (Batch)
- ☐ Mixers, Concrete (Continuous)
- ☐ Mixers, Truck
- ☐ Mixing Plants, Central
- ☐ Molds, (Pipe, Joist, Ornamental, etc.)
- ☐ Off-Bearers
- ☐ Paints & Coatings, Concrete
- ☐ Pallets
- ☐ Pipe Machines
- ☐ Pumps, Concrete
- ☐ Racks, Curing (Concrete Masonry)
- ☐ Recorders, Concrete Batching
- ☐ Regulators, Temperature
- ☐ Reinforcing Equipment
- ☐ Sand-Lime Brick Machinery
- ☐ Saws, Masonry
- ☐ Scales
- ☐ Silo Stave Machines
- ☐ Silos, Storage
- ☐ Skip Hoists
- ☐ Skip Loaders
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- ☐ Tile Machines, Roofing
- ☐ Tractors
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- ☐ Turntables
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INDIVIDUAL .....

ADDRESS .....

CITY ..... STATE .....

Looking for Used Equipment?

Refer to the listings in this issue for a wide variety of used and surplus machinery and supplies.

CONCRETE MANUFACTURER USED EQUIPMENT SECTION

FOR SALE

1 BESSER K-3 TAMPER WITH ATTACHMENTS AND PALLETS

Box No. W 8, c/o Pit & Quarry Publications

FOR SALE

1948 Lith-I-Block Machine with all attachments. 2500—18 x 18 x ¾ steel pallets. 69—72 Block Racks. Can be seen in operation this month. We are getting larger machine.

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300 East Fillmore — Colorado Springs, Colorado

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Write for samples and prices of "LANSCO" CEMENT COLORS in bright shades of RED, YELLOW, GREEN, BLUE, BLACK, BROWN. Manufactured by

LANDERS-SEGAL COLOR CO.
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BURNED RED SHALE FOR CONCRETE BLOCKS OR BRICK. LIGHTWEIGHT, FIREPROOF, PROCESSED READY FOR USE. SHIPPED FROM APPALACHIA, VA. OR LAKE CITY, TENNESSEE.

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PHONE 3418 — DAY OR NIGHT
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COMPLETE CONCRETE BLOCK PLANT

Well established and in operation. Oldest and second largest in large Southwest City of 120,000 pop. Established in 1945. New equipment in 1949. Ill health reason for selling. Reasonable.

Box No. W 5, c/o Pit & Quarry Publications
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2500—8" full width steel pallets. Davolt 4¢ Ea.
1 Kelly 30 ft. mixer with built on Vibrating screen $1500.00
40 steel racks, 60 block cap. 15.00
1 George Hydraulic, best offer.

Sell all or part.

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FOR SALE

Hyster Lift Truck, Model QT 20. Complete with forks and scoop. In good condition and priced to sell at $1,800.00.

CENTRAL MIX CONCRETE
P. O. Box 767 — Rapid City, South Dakota
Phone 3265

FOR SALE AT A BARGAIN

1—Besser K-3 Block Machine
700—Steel Plain Pallets
25—Steel Welded Racks
1—Multiplex 27 cu. ft. Batch Mixer with 30 H.P. Ball Bearing Motor—all in A-1 shape.

FRIENDSHIP BLOCK & BRICK COMPANY
9970 Freeland Street — TE-4-5300
Detroit 27, Michigan

FOR SALE—Complete block plant now in operation and can be inspected in operation.
1—16' mixer
1—18" Conveyor
1—Dunn Tamp Machine, with pallets
1—Appley Little Giant Block machine (with pallets)
1—Lift truck complete with all wiring, switches and electric motors, loaded on your truck for $1,250.
We are buying larger equipment. Write or wire

STANDARD BLOCK COMPANY
Gulfport — Mississippi

TRADE • SWAP • SELL

1—	STEARNS Joltcrete #9 Complete. Less Base	$2500.00
3—	MORE STEARNS Clipper Stripper Block Machines. Ea.	750.00
1000	Solid Steel 8" Pallets. Ea.	.20
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100	Chase Racks, FOB North Carolina. Ea.	15.00
1	LEWIS - SHEPARD Rubber Tired Lift. Truck in Brand New Condition	200.00
1	F. C. George Block Machine	200.00
1—	STEARNS 28 Cu. Ft. Concrete Mixer. Brand New Condition, New Blades, Etc. Complete with Motor	$1500.00
1—	Kent Tamper	300.00
50—	Hinged Racks. Ea.	15.00
2—	Pallet Dunkers. Ea.	55.00

THOUSANDS OF STEEL AND ALUMINUM PALLETS IN STOCK; ALL SIZES. SEND TRACING FOR QUOTATION.

WE WILL TRADE, BUY, SWAP, OR SELL YOUR USED EQUIPMENT.

GENERAL ENGINES CO., INC.
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WRITE, WIRE, OR PHONE GLOUCESTER 6-2899
CABLE ADDRESS:—GENERENG — GLOUCESTER, N. J.

SEND US LIST OF YOUR USED EQUIPMENT. HIGHEST PRICES PAID FOR GOOD EQUIPMENT.

WE OWN THE EQUIPMENT WE ADVERTISE

MORTARLESS

- A limited number of factory-rebuilt Hand-Operated and Semi-Hydraulic Power MORTARLESS Interlocking Block Machines are now available to substantially reduced prices.
- These models are completely overhauled, with all moving and wearing parts replaced and equipped with the new vibration assembly. New head assembly permits the production of either Mortarless or Modular Mortar blocks in all standard and special sizes.

MORTARLESS TILE MACHINE CO., INC.
2623 Riverside Drive, Los Angeles 39, Calif.

FOR SALE

1 Used Model 9 Joltcrete with Modular 7⅝ x 7⅝ x 15⅝ attachment including 4000 steel pallets Code "Cake"

THOMAS W. NOBLE CO., INC.
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MINERAL COLORS for BRICK MORTAR STUCCO-PLASTER-CONCRETE

"Fine Because of Their Fineness"
Ask for samples and recommendations.
BLUE RIDGE TALC CO., INC.
HENRY, VIRGINIA

PACKER-HEAD WINGS

McCracken Type — PROVED to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

USED MACHINERY FOR SALE

One	Stearns Clipper Model A Block Machine, with 10", 8", 4", Mold Box. In Real Good Condition. Has been used only six months	$4500.00
One	12 ft. Stearns Mixer. Used only six months	550.00
One	Truckman like new	800.00
One	Hand Truck	95.00
One	20 ft. Belt Elevator	400.00
One	½ Ton Hoist with frame	200.00
One	7 Cubic ft. Mixer	325.00
One	Whetlaffer Block Machine	450.00
58	Racks with Stakes. Each	14.00
2	Steam Fans, like new. Each	85.00
2190	10" Steel Pallets. Each	.50
2239	8" Steel Pallets. Each	.45
1092	4" Steel Pallets. Each	.30
750	8" Wood Pallets. Each	.15

Peninsula Masonry Supplies
BEAMSVILLE, ONTARIO, CAN.
Phone 273

FOR SALE
COMPLETE CONCRETE PIPE PLANT

1 Heavy Duty Quinn Concrete Pipe Machine for making Tongue and Groove Concrete Pipe from 12" through 60" Diameter, complete with Motors, Starters, Switches, etc., 28 cu. ft. Mixer complete, Standard Wall Jackets, Pallets, Cores, etc., from 12" through 48". Hydraulic Carts from 30" to 60" inclusive, wire roller and extra parts. This equipment used very little and in new condition.

Box W 7, c/o Pit & Quarry Publications
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FOR SALE

2 Model A Stearns Clippers—cheap

1 Stearns No. 9 Joltcrete—less than 2 years old, power carriage and power offbearer, 8, 6, and 12 inch attachments with pallets and racks.

Box No. W 9, c/o Pit & Quarry Publications
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PORTLAND
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PENNSYLVANIA-DIXIE CEMENT CORPORATION

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Different... Sensational... **WORK THE FIRST DAY AND THEREAFTER**

$4300.00! HOW CAN SO LITTLE MONEY BUY SO MUCH! **400 BLOCKS PER HOUR**

VAN-U-MATIC BLOCKMAKER

VAN-U-MATIC has ALL the features . . . Pneumatic power operation, vibration and off-bearer . . . Plain pallets (⅓ usual pallet investment) . . . Makes all size blocks, 16″ or 18″ length . . . Quick, easy changeover . . . True dimensional, Perfect blocks . . . Compact, easy to install and clean . . . We can finance.

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OSWALT SERVICE in your plant increases your profit by at least sixty dollars per day.

Every 100 days you operate your Besser Vibrapac you pay for OSWALT SERVICE in other ways, without having the benefits.

Every day you put off ordering this service costs you at least $60.00 per Vibrapac.

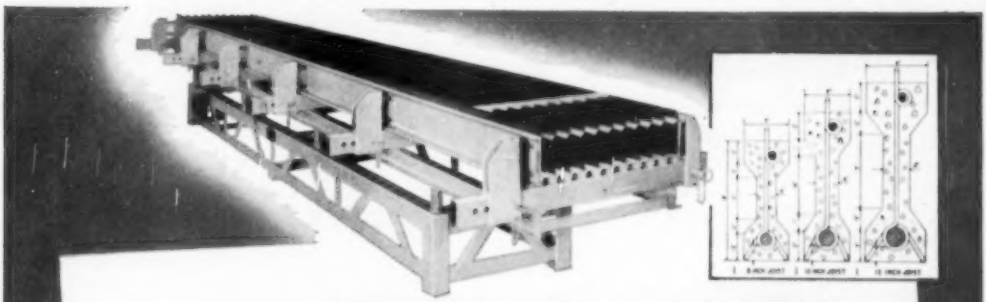
OSWALT

ENGINEERING SERVICE CORPORATION

1335 CIRCLE AVE. **FOREST PARK, ILL.**

WRITE OR PHONE US FOR THE NEAREST OSWALT SERVICE PLANT

Phone: Columbus 1-7073 — Forest 6-3898



. . . ADD A NEW PROFIT-MAKER! INCREASE YOUR VOLUME

Only small investment required!

The addition of the Kirk & Blum Vibrating Table to your present equipment requires a very small initial cost, enables you to make an entirely new line of 8", 10" and 12" joists in 20 and 24 ft. lengths.

Produce money-making concrete joists with the Kirk & Blum Heavy Duty Vibrating Table . . .

Cash in on the ever-growing demand for steel-reinforced concrete joists. Your experience and contacts in the building trade should make it easy to build up a profitable business in this new line. Concrete joists are simple to make, have unusual strength, are termite proof. The KIRK & BLUM Type "S" Heavy Duty Vibrating Table is capable of multi-production of concrete joists, allowing a fine profit-margin. Easily produced by unskilled operators. For complete details and prices, write to The Kirk & Blum Mfg. Co., 2912 Spring Grove Ave., Cincinnati 25, Ohio.

KIRK AND BLUM

Manufacturers of steel forms of all types . . . Curb, Gutter, Sewer, Road.

First choice of leading builders and manufacturers of concrete products for over 10 years . . .

CELOCRETE

REG. U. S. PAT. OFF.

The modern lightweight expanded slag aggregate made by The Celotex Corporation

More and more builders and architects are specifying Celocrete Units for homes, apartment buildings, schools, churches, office buildings, factories and other types of construction. They know that Celocrete Units give you all the advantages of conventional concrete masonry, *plus the bonus-benefits of light weight and effective insulation!*

only Celocrete Units give you all these advantages

Lightweight • Fire-Safe • Strong

Durable • Attractive • Nailable

Vermin-Proof • Sound-Absorbing

High Thermal Insulation Value

Provide Excellent Plaster Bond

Made with Aggregate Processed the Exclusive Celotex Way.

•

THE CELOTEX CORPORATION

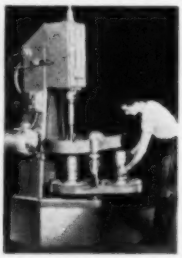
CHICAGO 3, ILLINOIS

CEMENT DRAIN TILE

Money-Making Manufacturing Opportunity

Today's tremendous demand for drain tile opens up a choice field for the wide-awake concrete products manufacturer. Either as a business by itself or as a profitable addition to the regular line.

The Champion machine makes all sizes of tile up to 12-inch diameter. With such a range you can supply not only the huge farm market, but many others where drain tile is urgently needed—reclamation projects, home building, road construction, subdivision activities, etc.



Low Cost—High Profits

Tile made on the Champion are outstanding in quality—dense, strong, uniform. Far better than clay tile yet can sell for less—even after allowing a handsome profit. Machine is simple, compact, easy to operate.

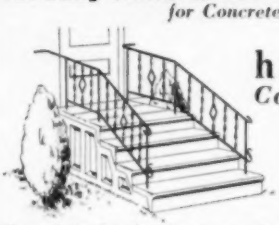
Get the facts. Write for interesting literature about the business and the moderate priced equipment.

CONCRETE EQUIPMENT CO.

532 Ottawa Ave. • Holland, Mich.

An easy climb to EXTRA PROFITS

for Concrete Producers licensed to make



Patented

homeward *Concrete* **STEPS**

MORE THAN 60 PLANTS OPERATING IN 25 STATES

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open. If you wish to have one of our field representatives contact you, write

ROGER F. WILLIAMS, Licensor

3420 S. W. 9th St. Des Moines, Ia.

Advertise Your

"Wants" and

Surplus Equipment

FMC 100 **BLOCK MACHINES** FMC 180

SKIP HOISTS • ELEVATORS • MIXERS

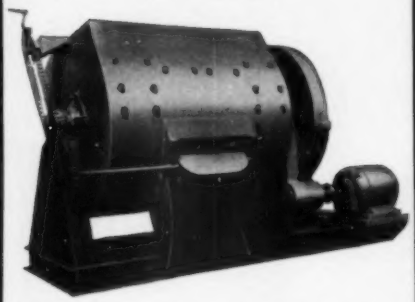
MATERIAL HOPPERS • RACKS • LIFT TRUCKS

THE FMC-24

supplied as

2 sack Standard Model **3 sack DeLuxe Model**

PLANT MIXER



Priced as a TWO sack Mixer with THREE sack Drum and Gear Reduction Capacity.

FOR PRICES AND DETAILED INFORMATION WRITE

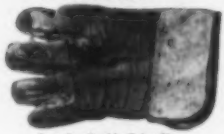
FLEMING MANUFACTURING CO. INC

COMPLETE CONCRETE BLOCK PLANT EQUIPMENT

4989 Fyler Avenue **St. Louis 9, Mo.**

Glove costs cut 65%

Grab-it Coated Glove



Nap Out Double Palm Glove

CASE NO. 194

Workmen regularly wore out double-palm fabric gloves handling 3000 bricks, laid without mortar in kiln floor. Same men with Grab-it Gloves now handle 15,000 bricks, reducing glove cost from 9c per thousand bricks to 3.2c. All tests showed close 5-to-1 wear ratio. Full details on request.

WORN 6 HOURS by Bricklayer's Helper

You can make comparable savings. On all work that requires a firm grip, wet or dry, on sharp cutting or abrasive materials such as concrete block, clay products, sheet metal, lumber, glass or bags, ***Grab-it*** gloves of tough, flexible, rough-surfaced natural rubber, bonded to strong fabric, far outwear heavy canvas or costlier leather — just like a tire.

FREE TEST: Write today, stating your job condition, materials handled and temperature. We supply sample gloves and complete test details to employers, without cost.

MANAGEMENT: It pays to promote better work gloves. Every dollar saved directly increases your profits — or the net income and good will of workers who buy their own.

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554 Orange St., Coshocton, Ohio

Quality **CINDERS**

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CLEANED, SCREENED, CRUSHED

SIZING: HALF INCH DOWN TO POWDER — READY MIXED FOR YOUR MIXER — LOW IN COMBUSTIBLE CONTENTS — FREE OF STAINING CAUSES.

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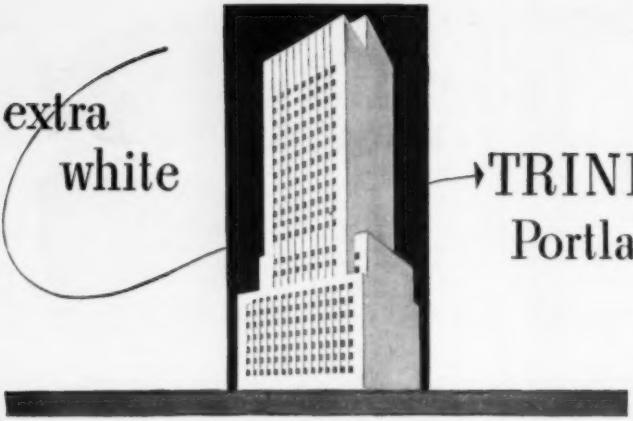

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Portland Cement

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TRINITY WHITE is a *true* Portland Cement

FIRESAFE FLOORS—

Built With
Vibrapac Soffit Floor Units
on Acrow Floor Centers

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1. Provide temporary horizontally suspended shoring so that floors and roofs can be constructed with Besser Vibrapac concrete block.
2. Make Besser Vibrapac Soffit Block a firesafe, economical, desirable and saleable concrete masonry floor unit.
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4. Greatly reduce labor and other costs over conventional methods of shoring with lumber for concrete floor construction.
5. Reduce time usually required for floor laying. Work goes on in clear space below while upper floors are being built with Acrow Floor Centers and Besser Vibrapac Soffit Block.
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7. Especially adapted for radiant heating installations.

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Complete Equipment for Concrete Products Plants.

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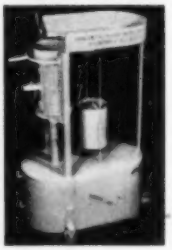
Here is the BIG PROFIT machine

THE MARVEL JR.— DRAIN TILE MACHINE



Included on the Marvel Jr. are numerous Pats. Pend. features of our Marvel Automatic. Now, no expensive, heavy, clumsy, in-the-way stationary machine is required.

MARVEL JR. is fast. Mounted on casters. Tile are off-bearred directly onto the floor and machine pushed forward as necessary. Save steps! Speed production!

The Marvel Jr. with standard equipment makes 4-inch round drain tile. Attachments can be secured for making 3", 5", and 6" round drain tile and also 4" Hexagon shape drain tile.

We are also the largest manufacturer of SPECIALTY MOLDS for making lawn, garden, porch and other concrete ornamentals.

Write or wire

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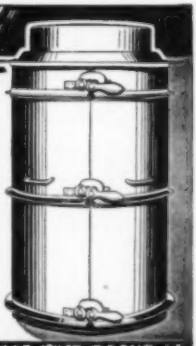
THE "Quinn Standard" FOR CONCRETE PIPE



The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

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8 TONS with an Erickson

NO PAVED RUNWAYS NECESSARY

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This "Super-Special" Erickson Power Lift Truck for handling extra heavy loads has a HYDRAULIC BOOSTER for easy steering. Perfect traction is assured by DUAL WHEELS all around with large pneumatic special tread tires. Special high tilting mast with boom attachment handles all sizes pipe up to 84" diameter. Multiple forks can be used to handle smaller pipe. All Erickson Fork and Platform trucks are individually built to meet *your* operating requirements. Tell us the job to be done — *write for literature.*

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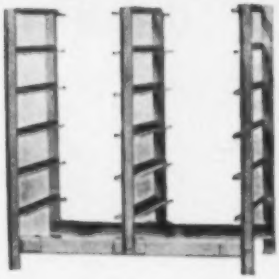
Corrosion-Resistant Hi-Strength Alloy Steel



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Sturdy construction • any style or capacity • Shipped knocked down • Rigid Field connections • assembled Easily

CHASE Foundry & Mfg. Co.

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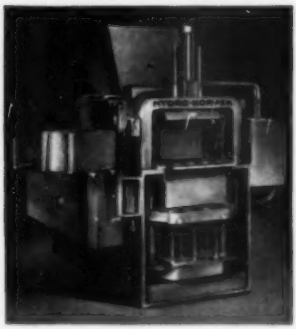

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- Modular conformation in all dimensions.
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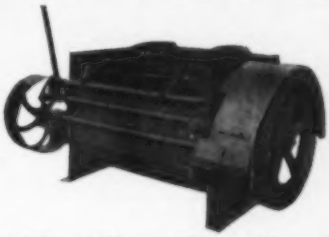

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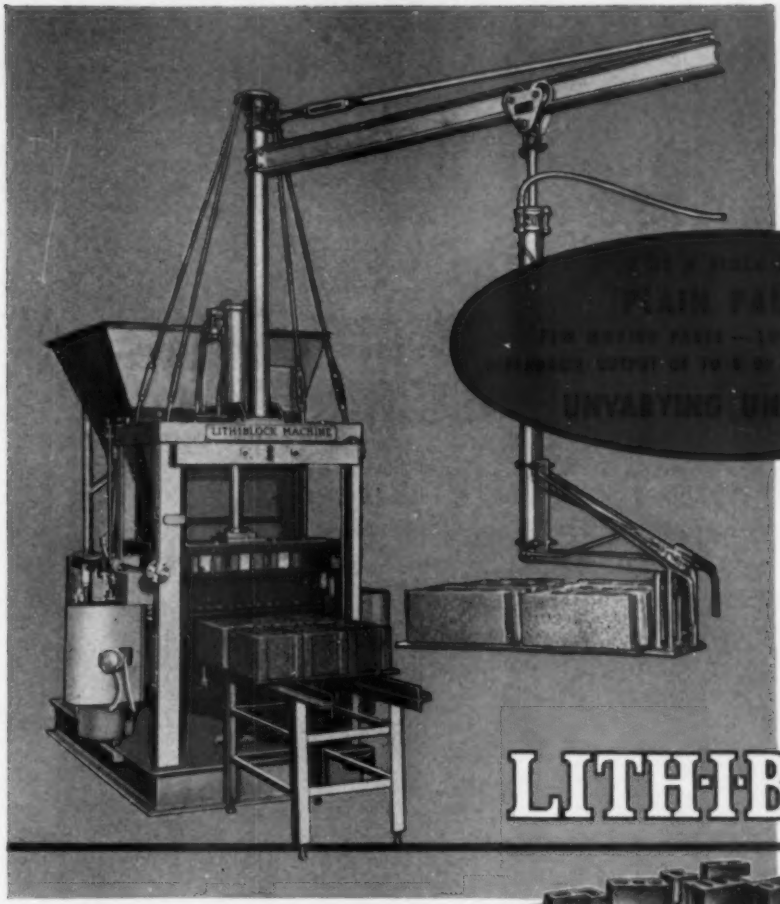

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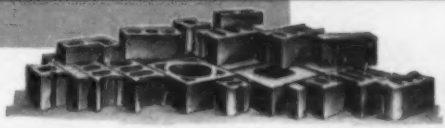
There's A Future In This Machine



You owe it to your business to know all about this machine—how it is engineered, how it performs, who has bought it, and why it is bound to improve your production efficiency and increase your earnings. Ask, and you shall have all the story. You can then act on the facts as you see them. . . .

. . But be sure you also look beyond the machine itself! For it is a matter of principle —and pride—with us that the making of a sale must also lead to the making of a friend. Installation of the machine is not the end of the road; it is for us and the Lith-I-Block producer the opening of a continuing relationship which keeps us an interested party to the deal as long as the machine shall live. Lith-I-Block is the name with a future—in building better business for Lith-I-Block producers! Let's get together and talk about your prospects.

Dept. CM5

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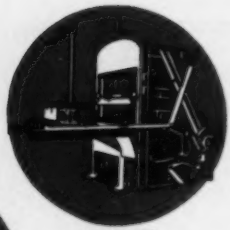

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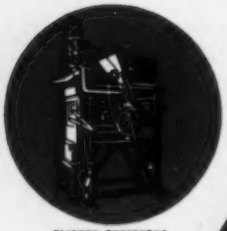

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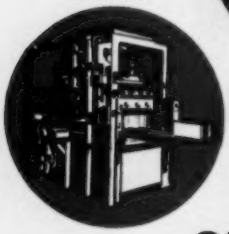

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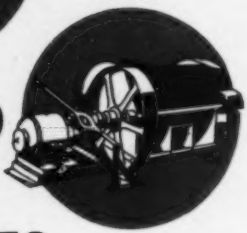

WHEN YOU NEED PARTS FOR ANY OF THESE MACHINES

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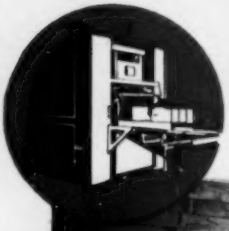

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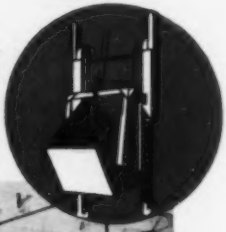

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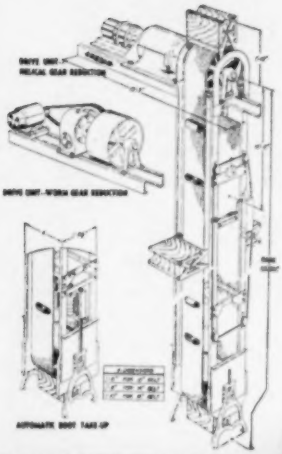

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Ehrsam Employees Service Elevator is made for 3 widths of belt, 12", 14" and 16" with three types of drive units of either 3, 5 or 7½ horsepower. Special applications for bags and boxes. Installation costs are reasonable. Write today for complete information.

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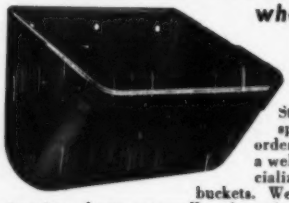

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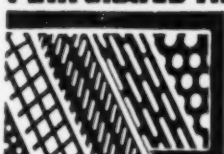

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1½"x15 ft.	6.00√	4"x10 ft.	20.00√
1½"x20 ft.	8.00√	4"x20 ft.	53.75
2"x10 ft.	6.50√	*5"x15 ft.	35.00√
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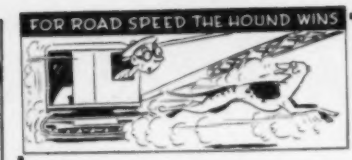

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2—Gardner-Denver 500 cu. ft., 2-stage, water-cooled, Caterpillar D13000, on four pneumatic tires. Practically new.

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New 18" — 24" — 30" — 36"

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32" dia. Pennsylvania Impactor

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Consisting of 10-16 Roller Bearing Jaw Crusher, 16-16 Roller Bearing Roll Crusher, 30"x9'5" Double Deck "CEDARAPIDS" Horizontal Vibrating Screen, Return Wheel System, 20" Plant Conveyor, 18" Under Crusher Conveyor, 24"x22' Folding Delivery Conveyor, 18" Reciprocating Feeder with Hopper and Grizzly, on 4-wheel Pneumatic Tired Truck with all Chutes, Hoppers, Drives and Clutch Controls. Includes Operator's Platform, Model 3031C General Motors Diesel Power Unit, Motor Platform, Drive for Power Unit and Rear Wheel Air Brakes.

Purchased new October 1, 1947, excellent used condition, working every day, available May 1. Wire or phone for exact location. Price, f.o.b. shipping point in Missouri.....$15,000.00.

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1—new 18 x 32 solid steel frame style D crusher.

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1—#6 McCully crusher in good running condition just taken from service.

2—6' dia. 12 x 16' long scalping screens 2¼" manganese perforations.

A number of new manganese steel screen sections for Allis Chalmers 6' revolving screens 2¼" perforations.

New and rebuilt jaw crushers in all sizes from 6 x 10 to 42 x 60.

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(Other Blowers from 1,000-50,000 CFM)

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CONVEYORS—L. B., flat, 24" wide, 30' cc. Rapid reversible power booster, Model RPBC-1516, 16"x15'.

CRUSHERS—Williams Hammermill No. 3. Jeffrey Swing Hammermill 36"x24", A2.

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4 x30'x⅝" Traylor.
7'x45'x½" Link Belt.
3'10"x16' Link Belt, Roto Louvre.
6'5"x60' and 7'x70'.

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Allis-Chalmers, 36"x12"x8'.

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REDUCERS—Link Belt PIV Drives—
Size V-1, ratio 2 to 1.
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Reeves Variable Drives,
Sizes #0, #000, #2, ratio 2-1.

Cleveland, Size 400-AH, ratio 3 5/9 to 1 and 4 5/6 to 1.

Cleveland, Size 200-AH, ratio 5 4/5 to 1; Size 100-AH, ratio 5 3/5 to 1 and 50 to 1; Size 20-AT, ratio 60 to 1.

Link Belt, Size HWB-50, ratio 34.5-1 and 52 to 1.
Size HWB-60, ratio 42.5 to 1 and 110 to 1.
Size HWB-35, ratio 220 to 1.
(Other Reducers ratio 4-1—203-1, 1-50 HP.)

TANKS—25000 gal. rubber lined, 12'x25'x⅜" (Unused).
(Other tanks from 330-41,000 gals.)

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Cam & Roller Type—8x10, 6x20, 10x16, 10x20, 10x26, 11x18, 12x18, 12x22, 12x24, 12x26, 11x24, 11x26, 13x24, 14x26, 14x28, 15x36, 18x32, 9x40, 24x40, 22x50

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16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
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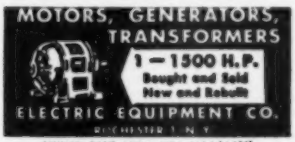

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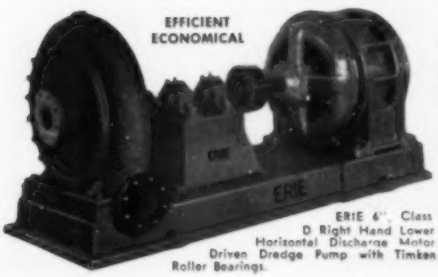

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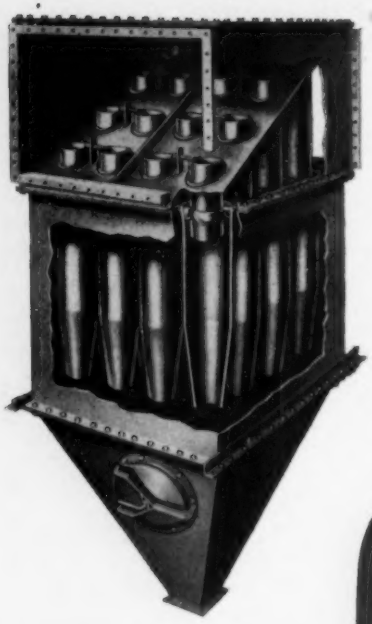

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***and only Multiclones* give vital advantages like these...**

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Uniformly High Recovery: MULTICLONE's multiple *small diameter* tubes—made possible by its exclusive vane design—whirl the dirty gases with greater centrifugal force, thus throwing out not only the large, medium and small particles, but also a high percentage of the *extremely small* particles of 10 microns and less. This, coupled with the fact that there are no pads or filters to become choked with recovered material, results in a more complete recovery of *all* suspended materials from the gas stream.

Space-Saving Compactness: Plant space costs money—so be sure to check space requirements carefully. As shown in the accompanying chart, the MULTICLONE requires less floor space and less cubic space than any other unit of comparable capacity and performance. Translate these savings into today's high costs for plant space and you readily see the great importance of this one MULTICLONE advantage alone!

Make	Relative Space Requirements In Sq. Ft.	In Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.8
Collector B	5.9	3.2
Collector C	6.8	3.9

Long and narrow

Square

Maximum Adaptability: In addition to its unusual compactness, the MULTICLONE is also unusually adaptable to various installation requirements. Where head room is low it can be installed with side-inlet side-outlet connections. Where side clearances are restricted, it can be installed with side-inlet top-outlet connections. In addition, without changing capacities, the shape of the unit can be varied—long and narrow, short and wide, or square—to fit restricted spaces . . . and its single-inlet single-outlet duct requirements permit greater flexibility and simpler installation. These savings slice installation costs, space requirements and insulating expense.

Minimum Maintenance:

The MULTICLONE has no high speed moving parts to repair or replace . . . no pads or filters to clean or renew . . . nothing to choke the gas flow or increase draft losses as suspended materials are recovered. MULTICLONE draft losses remain uniformly low *at all times*. Further, the recovered material from an entire bank of tubes is collected in a *single* hopper—far easier to service and maintain than the multiple hoppers of conventional cyclone units.

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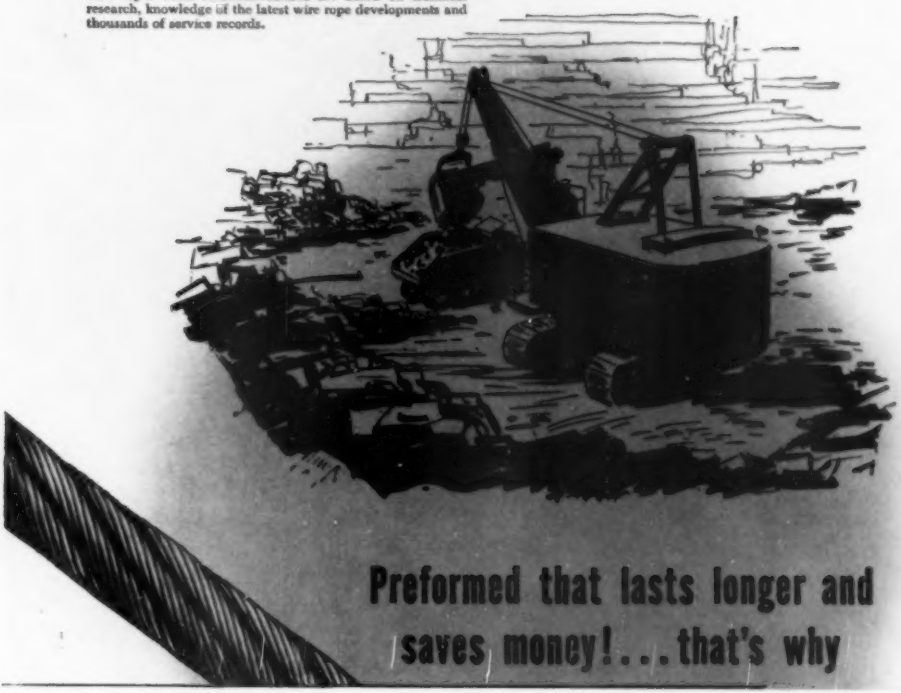

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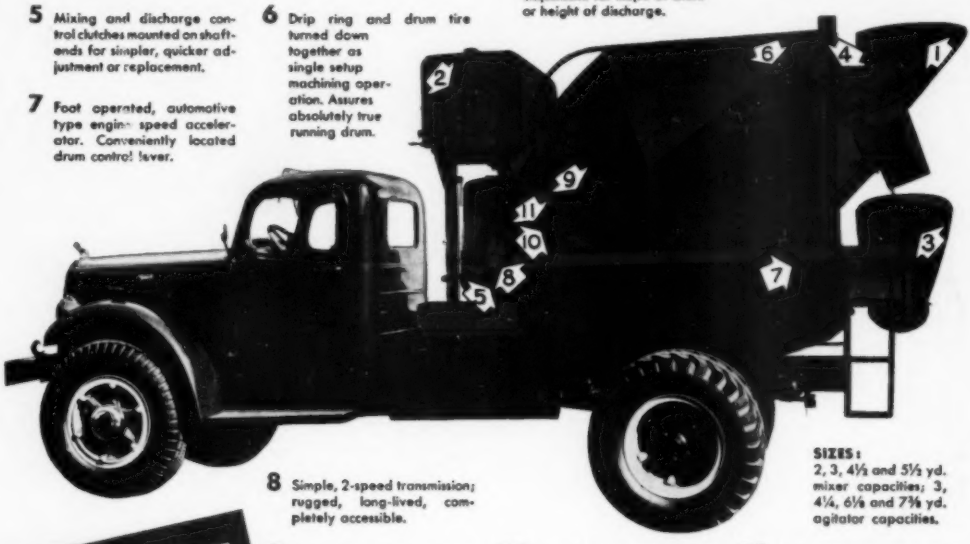

SIZES:
2, 3, 4½ and 5½ yd. mixer capacities; 3, 4¼, 6⅛ and 7⅜ yd. agitator capacities.

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